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The Pan-Pacific Entomologist

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THE CALIFORNIA MAYFLIES OF THE GENUS RHITHROGENA

(Ephemeroptera)

W. C. Day

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Since its description as *Heptagenia brunnea* in 1875 by Hagen, *Rhithrogena brunnea* has been known by but one adult female and one adult male specimen, the penes of the latter being figured in a general way by Eaton in his revisional monograph. The type locality of the species was given as "Nevada, Truckee, in Sierra Nevada Range," which can probably be taken to mean some location on the Truckee River between its headwaters and Reno, Nevada.

Collecting in each of four years on the Truckee River and its tributaries, my wife, Helen L. Day, and I have reared and taken by aerial net about 150 male adults of *R. brunnea*, and have reared 35 additional male adults in Shasta County and Mono County. We have found both nymphs and adults of this species to be highly variable in size, color and maculation. In our earlier collecting we noted that the positioning and the appearance of the penes of the male adult was also extremely variable.

Variation of appearance of the penes in this species makes classification most difficult as at least five *Rhithrogena* species of the *brunnea* group are so closely allied as to be separable only by the form and details of this feature. The basic separation of *R. doddsi* and *R. petulans* on one hand, and *R. brunnea*, *R. morrisoni* and *R. futilis* on the other, has traditionally been made on the erectness or the divergence of the two arms of the penes, the width and form of the tips of the penes, and the relative size of the ventral and apical spines of the penes.

For the two species of the above that we have collected in quantities, namely *R. brunnea* and *R. morrisoni*, I have found that the degree of stability in the form and positioning of the penes of collected adult specimens depends almost wholly on the method of killing. When a male adult is taken from the net and

dropped directly into 70% alcohol, the specimen ordinarily clamps the forceps across one another. At the same time, the arms of the penes may be brought together with ends folded into narrow, pointed tips; or the arms of the penes may be held straight out in parallel, with tips narrowly rounded; or the arms of the penes may be curved outward in wide divergence, with fully rounded tips in *R. brunnea* or more narrowly rounded tips in *R. morrisoni*. Any combination of these appearances and positions may be assumed.

Variation in the prominence of ventral, dorsal and distal spines of the penes depends considerably on the freshness or dryness of the specimens when placed in alcohol for preservation. After the male adult is dry-killed, excessive drying of the penes causes the integument to shrink away from the bases of the spines so that these spines appear to be larger than normal in size.

After several experiments, I believe that adults of these species should be placed, immediately after capture, in loose tissue in a dry killing jar charged with ethyl acetate (ether acetic), and kept there for about one and one-half hours before immersion in 70% alcohol. This treatment provides museum specimens of uniform and life-like appearance and avoids distortion and variation in the positioning and appearance of the penes.

On each of the four evenings of July 2–5, 1954, we found a small swarm of *R. brunnea* at 5:30 p.m., P.S.T., at a point some 50 yards from the Upper Truckee River near Highway 50. Placing alternate male adults in (1) 70% alcohol and (2) in the dry killing jar charged with ethyl acetate, we totaled 59 specimens in alcohol and 60 in the dry jar.

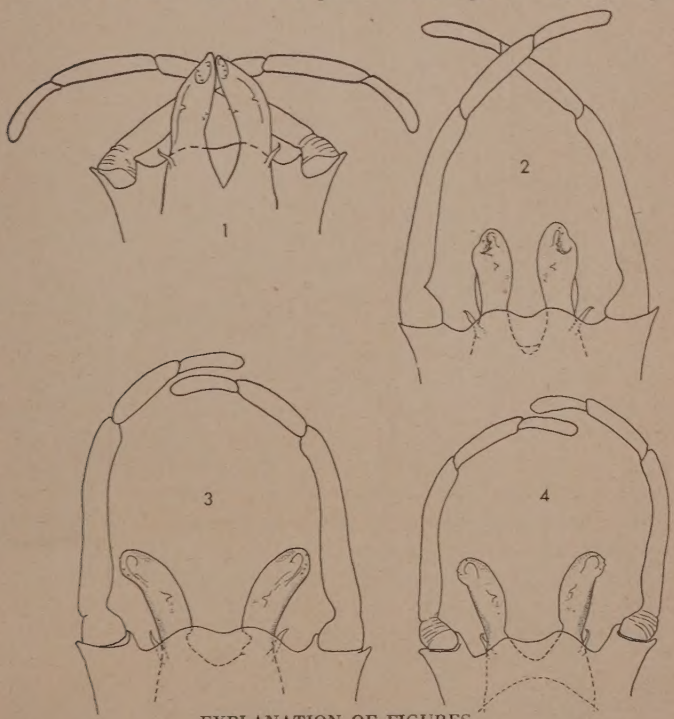
Of the 59 specimens placed directly in alcohol, 55 showed tightly clamped forceps and great variation in the appearance of the penes, the accompanying figures 1, 2 and 3 presenting examples of this variation.

The 60 specimens taken through the ethyl acetate killing jar before immersion in alcohol produced not a single specimen with clamped forceps, and provided 60 specimens with penes of life-like appearance showing little distortion or variation in divergence. In figure 4, forceps and penes are shown in the form that I regard as the true appearance of these parts in *R. brunnea*.

The centrally placed ventral spines of the penes are usually quite strong in *R. brunnea* but, as in *R. morrisoni*, there is con-

siderable variation in both the size of these spines and their number. Occasionally the ventral spine of *R. brunnea* is lacking on one arm of the penes and, in other cases, two ventral spines appear on one arm.

The apical spines of the penes of *R. brunnea* belong to the outer lateral margin but are sometimes also partly dorsal; they are always short, sometimes heavy and well-formed and again little more than blunt and shapeless protuberances. They are identical in form, variation and placement with the similar spines I have seen in *R. doddsi* from Utah. Another feature shared alike by *R. brunnea* and *R. doddsi*, and not previously reported for either, is the existence of from one to four tiny spines on the dorsal surface of each arm of the penes. These spines are centrally



EXPLANATION OF FIGURES

1–4, genitalia of *Rhithrogena brunnea*; 1–3, various distortions of penes; 4, natural appearance of penes.

located and usually somewhat basad of the position of the opposite, heavier ventral spines.

The structure of the penes of *R. brunnea* and *R. doddsi* is identical. The ends are smoothly rounded and expanded, the openings of seminal ducts are large and surrounded by a darkened area, and the lightly chitinized strip along the basal lateral surfaces is identical in size, form and placement. Both nymphs and adults of *R. brunnea* and *R. doddsi* seem identical in detail except for difference of divergence of the arms of the penes of the adult male after death. Occasional specimens from Utah and New Mexico show slight distortions of the penes that exactly match the distorted form of these parts shown for the California specimen in figure 2. On the eastern slope of the Sierra Nevada we find many Rocky Mountain species from numerous orders of insects and it seems quite possible that *R. brunnea* and *R. doddsi* represent populations that are simply geographic races of the same polytypic species.

Collecting *R. brunnea* in Nevada, Placer, El Dorado, Mono and Shasta Counties, we have noted considerable variation in coloration of the adults, often among those taken simultaneously. The body shades from light to very dark brown, wingveins and mesonotum vary from pale, yellowish brown to fuscous, and the bodies of numerous adults are bright ruddy in color.

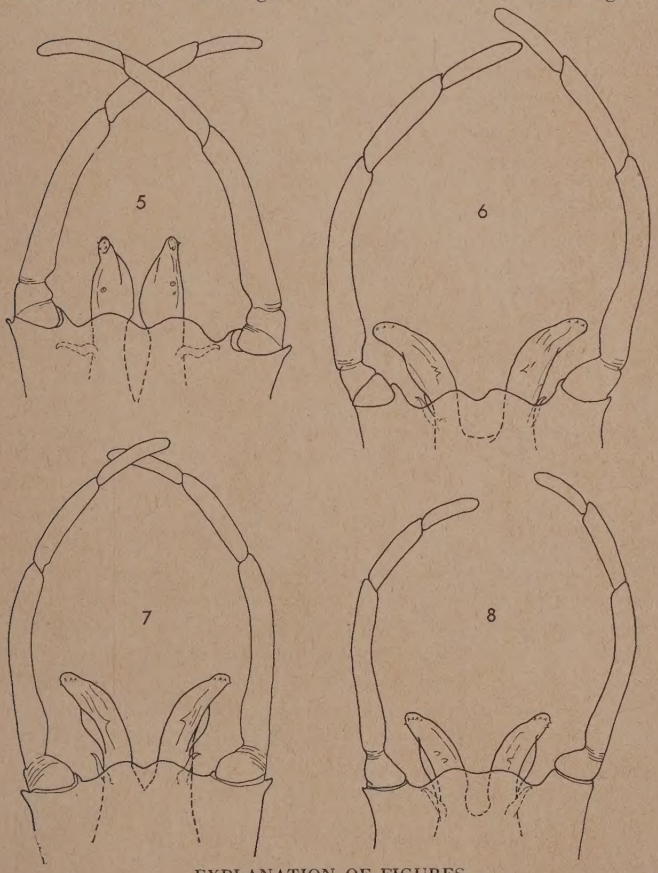
Nymphs of *R. brunnea* are highly variable in color and fall into three basic groups, (1) concolorous brown, from pale to very dark, gills white, (2) brown, with tergites 7 and 8 almost entirely white, gills white, and (3) body pale pinkish brown, gills bright red. In this latter phase, both lamellae and fibrillae of the gills are bright crimson, the legs are often bright red, and the abdomen has a pinkish cast; these nymphs rear to adults broadly and sometimes strongly marked with dark red. In four situations I have attempted to roughly establish the proportions of the three color phases of these nymphs coexisting in a short stretch of stream; of 273 nymphs collected, 42 (15%) had at least red gills, 101 (37%) were brown with tergites 7 and 8 white, and 130 (48%) were concolorous brown.

Rhithrogena morrisoni

Precautions in killing the adults of *R. morrisoni* apply with equal force as with *R. brunnea*, as killing directly in alcohol leads to variation and distortion of the penes as shown in figures 5 and

6. A drawing of the natural position of the genitalia of *R. morrisoni* as observed in California is given in figure 7.

Intermixed with brown nymphs, we frequently find nymphs of *R. morrisoni* that have bright crimson gills, legs and abdomen, with touches of red on head and pronotum. When reared, the red nymphs usually produce adults with bright red legs and abdomen, the tails and wingveins being a pale yellow brown. Because the tails and wingveins of the red adults are much lighter



EXPLANATION OF FIGURES

5–8, genitalia of *Rhithrogena morrisoni*; 5–6, distortions of penes; 7, natural appearance of penes; 8, genitalia of red adult reared from red nymph.

in color than those of the adults reared from brown nymphs, I suspect that the redness of the nymph is due to the subtraction of some color substance from the total color pigment of the brown nymph. The normal appearance of the genitalia of the red male adult is identical with that of the brown adult, and is shown in figure 8.

As a rough guide to the ratio of red to brown nymphs of *R. morrisoni*, a count was kept for several collections in Yolo and Napa County. In these collections 272 nymphs were taken, of which 49 (18%) were red, and 223 (82%) were brown.

Ventral spines of the penes of the male adult vary in size from very large, as in the largest similar spines of *R. brunnea*, to smallness that makes them difficult to see with the stereoscopic miscroscope. Variation in number of these ventral spines goes from no spines on either arm of the penes to three spines on each arm. In 68 male adults reared from nymphs taken from Cache Creek, Yolo County, California on April 19, 1952, the following breakdown was made:

	Ventral Spines on Penes	
No. specimens	*Left arm*	*Right arm*
1	0	0
3	0	1
41	1	1
18	1	2
4	2	2
1	2	3

We have collected specimens of *R. morrisoni* in the following California counties: Alpine, Amador, Sonoma, Napa, Yolo and Marin, and have received male adult specimens from Los Angeles and San Bernardino Counties. From this distribution it may be seen that *R. morrisoni* inhabits five differing life zones in California, namely, the eastern slope of the Sierra Nevada, the western slope of same, the barren areas of the eastern slope of the Coast Range, the Redwood Coastal strip, and the San Gabriel mountains.

Rhithrogena petulans was described by Seeman (1927) as *Iron petulans* from Cucamonga Canyon, San Bernardino County, California, and I have examined the four penes on micro slides and one male adult from Cucamonga Canyon placed in the Cornell University collection as the type material. Also, through the kindness of Dr. Henry Dietrich I have examined material from nearby Icehouse Canyon, San Bernardino County, collected by

Michener and identified by Traver as *R. petulans*. Additional specimens from the same area have been supplied me by Dr. Fred S. Truxal, same having been collected in San Gabriel Canyon, Los Angeles County and Adahi, San Bernardino County.

R. petulans was separated from *R. brunnea* and *R. morrisoni* by the erectness of the penes of the former. Only one specimen from Cucamonga Canyon shows this erectness, one specimen has penes slightly divergent, two are widely divergent and the other is badly mounted. The Michener collections show two specimens with erect penes and one divergent. If collected in alcohol, the diversity of appearance of the Seeman and Michener material is explained but, in any case, the type material does not bear out the original description.

The four male adults from Truxal taken from San Gabriel Canyon and Adahi were pinned and I restored and mounted the genitalia on slides, finding them to be very good normal examples of *R. morrisoni*. Thus, in eleven good specimens including the type material, and all from the same area, seven are quite positively normal specimens of *R. morrisoni*. I therefore conclude that *R. petulans* is a synonym of *R. morrisoni*. There are but four good species of the genus *Rhithrogena* that have to date been reported from California these being as follows: *R. brunnea* Hagen, *R. decora* Day, *R. flavianula* McDunnough, *R. morrisoni* Banks.

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Book Review

THE WORLD OF BEES by Gilbert Nixon. 214 pp., frontispiece + 16 figs. (by Arthur Smith). Philosophical Library, New York. 1955. Price $4.75.

This is a popularization of bees and their biologies. It is interesting reading and should provide the layman with considerable accurate information. The illustrations are beautifully drawn but most will serve only as aids to identification of representative adult bees of the British fauna. Additional illustrations depicting nest diagrams, pollen storage, egg positions, developmental stages, etc., would have been desirable to support the main theme of the book and increase its popular appeal.

* * *

Book Review

BIRD AND BUTTERFLY MYSTERIES by Bernard Acworth. 303 pp., 11 figs., 3 colored plates. Philosophical Library, New York. 1956. Price $7.50.

Entomologists will be concerned primarily with Part III of this book, "Butterfly Migration and other Phenomena." The other parts treat bird migration, the cuckoo mystery, and other subjects. All treatments can be classed as philosophical essays in which little or no original data or observations are put forth. The author casts doubt on the validity of many widely accepted theories to explain evolution, mimicry, migration, etc. Unfortunately, the representation of these theories is often highly subjective and even erroneous. Many of the author's ideas strike me as naive and based on misinterpretation or ignorance of published knowledge. An example of the latter, on page 259, is his bewilderment over the number of butterfly species referred to as the "painted lady."

* * *

Book Review

INSECTS AND SPIDERS. A book of keys with biological notes by C. P. Friedlander and D. A. Priest. vii + 124, 21 plates. Philosophical Library, New York. 1956. Price $2.75

This book by two biology teachers in English preparatory schools, reduces to their barest essentials keys and illustrations for identifying the common groups and species of British insects and spiders. The 21 plates are composed of simple, often crude, line drawings of key characters of the groups treated.

Apparently intended to aid beginners, the book is likely to defeat its purpose by presenting insect study in a most unattractive form at the very time the student's interest is usually delicately poised and in need of the highest type of stimulation.—E. S. Ross, *California Academy of Sciences.*

TWO NEW SPECIES OF THE GENUS RECURVARIA HAW.

(Lepidoptera: Gelechiidae)[1]

T. N. FREEMAN[2]

Insect Systematics and Biological Control Unit

Entomology Division, Ottawa, Canada

Many species of the genus *Recurvaria* occur in North America. They may be divided into two main groups. The larvae of one group are miners in the needles of various conifers, often passing from one needle to another through a thin, silken tube along the stem. The larvae of the other group feed on deciduous plants, and usually live in a silken tube on the surface of the leaf. The genus contains many closely allied species, and the systematics of the group is not fully understood.

For several years needle miners have been pests of coniferous trees, particularly lodgepole pine, *Pinus contorta* Dougl., in the mountainous regions of Western Canada and the western United States. A recent study of these miners showed that several species are involved, most of them having been recorded as *Recurvaria milleri* Bsk., which is a pest of lodgepole pine known only from the Yosemite and Sequoia National Parks, California. A review of all the Canadian species of needle miners is in preparation, and this paper is presented to provide specific names for two new species that are currently of economic importance. For the most part, economic references are omitted because of the impossibility of making correct nomenclatorial association. The terminology used in the descriptions of the male genitalia was adopted from Heinrich (1920, Proc. U.S. Nat. Mus. 57:92, Pl. 5).

Recurvaria starki Freeman, new species

Recurvaria milleri auct. (in part) *nec* Bsk.; Hopping, 1945, Proc. Ent. Soc. British Columbia 42:1–2; McLeod, 1951, Canadian Ent. 83:295–301.

Recurvaria sp., Stark, 1954, Canadian Ent. 86:1–12.

Antenna alternately marked with ocherous-white and black bands. Palpus rather short, not tufted in the male (Fig. 3). Second joint of palpus whitish inwardly, ocherous-fuscous outwardly; third joint white with ocherous-fuscous base. Face and vertex shining white. Thorax and fore wing light grey, the latter with somewhat obscure blackish patches crossing the wing at the basal third, at the outer two-thirds, and near the apex; the post-median band bordered outwardly with white and appearing to be sharply angled outwardly at its middle. The patch near the apex extending obliquely

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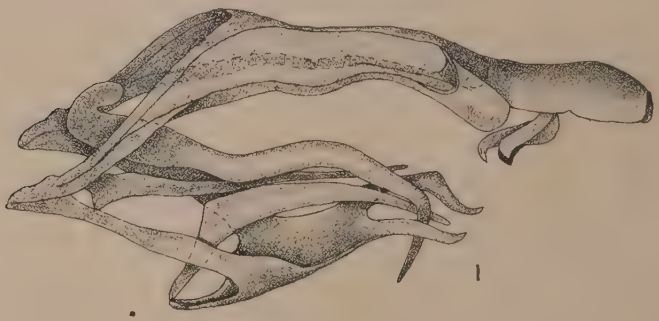
[2] Senior Entomologist.

inward almost to the posterior margin. Apex of wing mostly white, and with an obscure, blackish, central area (Fig. 6). Hind wing pale smoky. Fringes of all the wings shiny, light, ocherous-grey. Under surfaces of all the wings, dull white. Male with a long, ocherous hair-pencil arising from beneath the anal angle at the base of the hind wing. Fore and mid tibiae and tarsi alternately banded with black and white scales. Hind tibia whitish, with long hairs above. Each segment of hind tarsus grey, with a white tip. Wing expanse: 12–13 mm. Moth in the latter half of July.

Male Genitalia (Fig. 1).—Uncus rooflike. Gnathos with three hooklike processes, the median one slightly the longest. Caudo-lateral projections of tegumen asymmetrical, flaplike. Claspers asymmetrical, tubular twisted; the right clasper much larger than the left. Aedoeagus pistol-shaped. Vinculum produced apically into two somewhat asymmetrical hooklike sicae.



EXPLANATION OF FIGURES

Figs. 1–2. Male genitalia. 1, *R. starki;* 2, *R. canusella.*

Holotype.—Male, MT. EISENHOWER (NEAR BANFF), BANFF NATIONAL PARK, ALBERTA, July 19, 1954. Reared from *Pinus contorta* Dougl. by officers of the Forest Insect Survey, Forest Biology Division. No. 6298 in the Canadian National Collection, Ottawa. *Paratypes.*—Twenty males and 16 females. Mt. Eisenhower, Banff National Park, Alberta, July 17 and 19, 1954. Eleven males and five females, Cascade Mountain (near Banff), Banff National Park, Alberta, July 18 and 19, 1954. Two males, Lake

EXPLANATION OF FIGURES

Figs. 3–5. Head and palpi. 3, *R. starki;* 4, Female of *R. canusella;* 5, Male of *R. Canusella.*

Fig. 6. Holotype, male, *R. starki.* Fig. 7. Holotype, male, *R. canusella.* Fig. 8. Paratype, female, *R. milleri.*

Louise. Banff National Park, Alberta, July 20, 1954. Two females, Mt. Edith Cavell (near Jasper). Jasper National Park, Alberta. July 15. 1954. All paratypes reared from *Pinus contorta*, and No. 6298 in the Canadian National Collection, Ottawa.

Food Plant.—Pinus contorta Dougl.

This species is closely allied to and has been confused with *R. milleri* Bsk. The male genitalia appear to be identical with those of that species and of *R. moreonella* Heinr., a species described from a single male reared from *Pinus scopulorum* (Engelm.) Lemmon at Cheyenne Mountain, Colorado. *R. milleri* (Fig. 8. paratype) is somewhat larger, mainly white with black longitudinal streaks or distinct irregular spots. *R. moreonella* has a narrow irregular line of white scales extending longitudinally through the middle of the wing. from the end of a sub-basal black streak to near the apex. *R. starki* and *R. milleri* are needle miners that require two years to complete their life-histories in the type localities (see Stark, 1954). This species is named in honour of Dr. R. W. Stark, who has been working on the biological and economic aspects of this species.

There is some evidence to suggest that *R. milleri*, *R. moreonella*, and *R. starki*, as well as some allied species, do not belong to the genus *Recurvaria* Haw. The male genitalia of *R. nanella* Hbn., the genotype of *Recurvaria*, are bilaterally symmetrical. The male genitalia of the group of species under consideration are asymmetrical. There is also a difference in the shape of the signum in the bursa of the female. Further studies are necessary to elucidate the generic significance of these characters.

Recurvaria canusella Freeman, new species

Antenna alternately marked with ocherous-white and black bands. Palpus long and upcurved in the female (Fig. 4). Second joint of palpus whitish basally, blackish-fuscous apically; the male with a strong white triangular tuft on the inner side (Fig. 5). Face and vertex shiny white, with a few fuscous scales laterally and dorsally. Thorax and fore wing dark brown-grey, the latter with an obscure, black, raised spot below the fold at the basal one-third, the spot marked outwardly with a small white dash; a similar spot below the fold near the middle; and another above the fold at the outer two-thirds, bordered by white scales forming a small, distinct, white X; apical portion of wing speckled with white scales and small black dots or lunules; a faint white patch on the costa at the middle and one at the outer two-thirds (Fig. 7). Hind wing shiny grey. Fringes of all wings shiny light ocherous-grey. Under surface of fore wing shiny ocherous-grey, of hind wing light shiny grey. Male with a long, ocherous, hair-pencil arising

from beneath the anal angle of the hind wing. Tibiae and tarsi banded with dark-brown and white scales. Wing expanse: 10–11 mm. Moth in mid or late June.

Male Genitalia (Fig. 2)—Uncus trifid at apex. Gnathos with a single long hook. Caudo-lateral projection of tegumen strongly produced on the left side. Claspers asymmetrical, tubular, twisted: the right one considerably the larger, and expanded at the base. Aedoeagus arcuate. Vinculum produced apically into two almost symmetrical, elbowed sicae.

Holotype.—Male. SQUILAX (NEAR SALMON ARM). BRITISH COLUMBIA. June 19. 1951. Forest Insect Survey No. 50–2085. Reared from *Pinus contorta* Dougl. No. 6299 in the Canadian National Collection. Ottawa. *Paratypes.*—Three males and nine females. Squilax. British Columbia. June 19. 1951, Forest Insect Survey. Reared from *Pinus contorta*. No. 6299 in the Canadian National Collection, Ottawa.

Food Plant.—Pinus contorta Dougl.

This species has also been confused with *R. milleri* Bak. It is readily distinguished by the male genitalia and the suffused maculation. It is a needle miner that apparently requires only one year to complete its life-cycle.

ACKNOWLEDGMENTS

I am indebted to Dr. R. W. Stark. Forest Biology Laboratory. Calgary. Alberta. and Mr. J. H. McLeod. Entomology Laboratory. Belleville. Ontario. for their assistance in providing considerable material for study. I am also grateful to Mr. J. F. Gates Clarke. United States National Museum. Washington. D.C.. for information and for the loan of many specimens.

AN IMPROVED METHOD FOR COLLECTING BRACHYCISTIDINE FEMALES

(Hymenoptera: Tiphiidae)

MARIUS S. WASBAUER

University of California, Berkeley

During the summer of 1956. the author was engaged in the collection of females of the subfamily Brachycistidinae in the Coachella Valley of California. These wingless nocturnal wasps occur mainly in sandy situations and are rather difficult to collect since they are quite rare. In the past. the principal method for

capturing them was to walk over sandy areas at night and search the surface of the ground with a gasoline lantern (Rozen, 1952:91). They have also been taken at stationary lights, however. Rozen *ibid.*, reports the attraction of females to stationary Coleman lanterns and Mickel and Krombein (1952:652) cite the capture of two specimens at Palm Springs in a gallon fruit can buried to the rim in the sand with a light suspended over it. In a recent shipment of material from the United States National Museum, there was a series of four females from Presidio, Texas taken in a trap similar to the above.

A light trap of this type is rather clumsy, not readily portable and requires a source of electric power or a stand for supporting a gasoline lantern. Thus a simple modification of this trap was devised which overcomes these disadvantages. It is easily carried and installed and makes the handling of specimens so obtained an easy matter. The trap consists of a gasoline lantern set on the ground in a suitable area and surrounded by a ring of cereal bowls sunk into the soil until their rims are flush with the surface. The trap functioned most efficiently when a closed ring of about seven bowls was placed around the base of each lantern.

The bowls used were of the ordinary porcelain type, 4½ inches in diameter and 2 inches deep (inside dimensions). The smooth glazed finish and steep sides prevented the escape of almost any crawling insect despite the shallow depth.

This method was employed from early June to early September in conjunction with other collecting techniques and was found to be quite successful in the capture of small brachycistidine females as well as certain other groups of insects and related arthropods. A few mutillid females, ants of several genera and species, and beetles (particularly Scarabaeidae and Tenebrionidae) were commonly found in the traps. Certain species of lepismids (Thysanura) were also collected in large numbers. Other arthropods frequently taken included spiders (mainly lycosids), solpugids and scorpions.

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CALICO SCALE, LECANIUM CERASORUM COCKERELL ON WALNUTS

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With the advent of the newer insecticides the problem of unarmored scales on walnuts increased. As a result, an investigation of their habits was undertaken. It has been found that a complexity of factors is involved, and that the general rise in the scale population is probably associated with an interference of the insecticides with natural enemies. This can be demonstrated easily where DDT has been used to control caterpillars attacking walnuts or where drifts of this insecticide have passed through the orchards where adjacent planting of corn or tomatoes have been dusted with DDT at critical periods.

The increase in the Calico scale population has not been as marked as that which has been encountered with other scales such as the frosted scale, *Lecanium pruinosum* Coquillett. In fact no orchards have been examined where apparent injury by the Calico scale was being inflicted.

According to Serr (1933) the calico scale was probably introduced into the San Francisco Bay area from the Orient. He noted that in 1930, isolated cases were found where it was killing fruiting wood in walnut orchards in the San Joaquin Valley, and by 1933 it was generally distributed in the area. He further observed that the insect exhibited wide fluctuations in the population and stated that there may be only a few scales one year, and the next year the infestation would be causing serious damage. Serr encountered cases where the scales had become so thick that they were literally piled up, one on top of the other. He reported that in the Bay region, parasites largely controlled the scale, but that in the valley districts, parasites were not able to accomplish this although a number of the scales were killed by these natural enemies. Serr believed that in time there might be a possibility of the parasites increasing sufficiently to make artificial control measures unnecessary.

This has apparently come to pass and Lowe (1935) observed the scale being brought under control by natural enemies. He observed that the Audubon warbler was very effective in reducing the scale population although parasitism also played a small part.

Despite any action of insecticides, natural agencies still appear to exert an important suppressing influence upon the calico scale. In the winter of 1955–1956 there was a large overwintering population of the pest in the experimental orchard at Linden, California. This seemed more noticeable in the plots that had received a combination spray of DDT and OMPA (octamethylpyrophosphoramide). The DDT had been directed against the codling moth, *Carpocapsa pomonella* (L.) and the OMPA to control the walnut aphid *Chromaphis juglandicola* (Kltb.). The density of the scale population apparently increased with an increase in the amount of OMPA applied per acre.

In winter when the overwintering scales begin to grow they take on a characteristic waxy pattern which easily differentiates them from other soft scales such as the frosted scale, *Lecanium pruinosum* Coq. and the European fruit lecanium *L. corni* Bouché. Their development is more rapid than that of the latter two. Field surveys conducted on February 8, and February 16, 1956, showed that the calico scale population remained about constant. However, a decline in the population was noted in March. The position where the scales had been was outlined with a waxy white line. The scales continued to disappear until only a very few were left. The period over which this occurred was of relatively short duration as indicated by the more or less uniform size of the white oval impressions left by the scales (fig. 1). The reason for the disappearance of the scales must be credited to observations made by Lowe (1935). He conducted his investigations in the same orchard where the present studies are being undertaken. His investigations showed that the Audubon warbler fed on the scales. This he determined after watching the birds through field glasses. He made a count on a group of branches upon which the birds had been feeding and found that out of 1,093 scales they had eaten all but 63, and that most of those remaining were parasitized. Although the Audubon warbler is present in the orchards until mid-April, feeding on the calico scale apparently is confined to that period of growth where the scale produces the waxy pattern.

Lowe commented that the Audubon warbler has been called the whirligig of perpetual motion, and that it is this quality that makes it possible for the bird to be so effective in destroying the scale population. The effectiveness of the bird is well illustrated

in Figure 1. where out of the many scales present in the winter only one survived. and it was parasitized. It is interesting to note that the impressions left by the scales which were eaten by the birds remained long after the scales were destroyed. The twig shown in Figure 1 was collected on May 24. and yet the scales

Fig. 1—Walnut twig showing whitish impressions left by young developing calico scales that were eaten by Audubon warblers. But a single scale escaped. and it was parasitized by *Blastothrix longipennis* Howard, as is evident by the emergence holes in the scale body.

met their doom probably sometime during the first half of March.

In the spring, the degree of parasitism in the remaining scales in the several OMPA treatments was determined. It was found to range from 96 to 100 per cent. The parasite was reared out and submitted to Harold Compere of the University of California Citrus Experiment Station at Riverside, California, for identification. He determined it as *Blastothrix longipennis* Howard, but stated that systematic entomologists are unable to distinguish this form from *sericea* (Palm.).

The above account is an excellent example of an insectivorous bird and an insect parasite working together to hold a potentially destructive scale pest under control. This occurs even under conditions where applications of insecticides probably have the tendency to induce increases in the scale population.

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BUTTERFLIES OF THE AMERICAN TROPICS

The American Museum of Natural History announces through a recently received brochure the prepublication sale of "Butterflies of the American Tropics," the genus *Anaea*, a study of the species heretofore included in the genera *Anaea, Coenophlebia, Hypna, Polygropha, Protogonius, Siderone*, and *Zaretis* by William Phillips Comstock.

This masterfully illustrated and executed work is to be published in only a *limited quantity* providing that the initial response is sufficiently great enough to warrant its publication.

Further information may be obtained from: Dr. Mont A. Cazier, Department of Insects and Spiders, American Museum of Natural History.—Editor.

NEW SPECIES AND RECORDS OF XEROMEGACHILE AND DEROTROPIS[1]

(Hymenoptera: Megachilidae)

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The subgenus *Xeromegachile* comprises the largest group of species of *Megachile* in the nearctic region, with about 30 originally included (Mitchell, 1934:305). As the name suggests, they are associated with a xerophytic type of vegetation, and consequently are much more abundantly represented in the western states than in the eastern United States. The center of origin evidently is in the western United States, and the known range of the group extends but little to the north or south into Canada and Mexico. Only five species occur in the eastern United States, and none are known from any other part of the world.

Closely related to *Xeromegachile* are two smaller groups, *Megachiloides* and *Derotropis*. *Megachiloides* was originally described as a new genus (Mitchell, 1924:154), with but a single species, *oenotherae* Mitchell, included. Its generic distinctiveness was based in part on the extreme length of the glossa and labial palpi, which in *oenotherae* cannot be carried folded beneath the head as in most leaf-cutters, but instead extend back from the head between the legs, nearly to the tip of the abdomen. Later it was found that other species, evidently closely related to *oenotherae*, did not exhibit this condition to the same degree, and it seemed best to assign it a subgeneric rather than a generic rank. Only three species are now included in the group, *oenotherae*, the genotype, and eastern in distribution, *amica* Cresson, from Texas, and *umatillensis* Mitchell, occurring in Washington and Oregon.

The species of *Derotropis* were originally included in *Megachiloides*, but in this group the glossa and labial palpi are more nearly of ordinary length, and the males, at least, are very hard to distinguish from *Xeromegachile*. Differences in the dentition of the mandibles make it possible to separate the females of all three groups easily, but the males do not share this ease of recogni-

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tion. Thus the females can be separated by the following characteristics (for figures, see Mitchell, 1936, Pl. VIII):

Xeromegachile: Three distinct mandibular teeth, and a short bevelled cutting edge extending from the third tooth to the inner angle; segments 1 and 2 of labial palpi about equal in length.

Megachiloides: Two distinct apical mandibular teeth, the third barely distinguishable or absent, and with a rather long cutting edge extending from the position of the third tooth to the inner angle; segment 2 of labial palpi 2–4 times longer than segment 1.

Derotropis: Two distinct apical mandibular teeth, and a very long bevelled cutting edge extending from the *second* tooth to the inner angle; segment 2 of labial palpi usually somewhat longer than segment 1.

With the males we are forced to rely on the relative length of the first and second segments of the labial palpi, and this is reliable only in separating *Megachiloides* from the other two. Also, the degree of sexual dimorphism is such that no association of the sexes is possible by morphological or any other visible characters. Consequently it is necessary to key out the males of *Xeromagachile* and *Derotropis* together, and males assigned to *Xeromegachile* sometimes prove to belong to the other group when an association of the sexes has been achieved.

In this paper a number of apparently new species in these groups are described, some new state records are given, and a key to some of the easily confused males of *Xeromegachile* and *Derotropis* is included. The new species were found in collections received from the University of Arizona, at Tucson, and the California Insect Survey, University of California, at Berkeley.

Megachile (Xeromegachile) crandalli Mitchell, new species

Female.—Size: Length 9 mm.; width of abdomen 4 mm.; anterior wing 7 mm.

Structure: Length and breadth of face subequal; eyes subparallel; clypeal margin finely denticulate; mandibles 4-dentate, with a cutting edge between the third and inner teeth; basal segment of flagellum slightly longer than pedicel and second segment, following segments successively very slightly longer; lateral ocelli subequally distant from eyes and margin of vertex; cheeks subequal to eyes in width; hind metatarsi nearly as broad as their tibiae, slightly longer than the following segments combined; apical margins of abdominal terga rather abruptly depressed; sixth tergum nearly straight in profile, with abundant subappressed pubescence. *Sculpture:* Punctures rather coarse, deep and closely crowded on clypeus, becoming somewhat finer but still very close on face and vertex, those on cheeks becoming somewhat more shallow and obscure, but still very close; fine and densely crowded on mesonotum except for a small area on each side where the punctures are somewhat more distinct, those on scutellum slightly more coarse and not so crowded; fine and densely crowded on pleura above,

but becoming more coarse and sparse below: very fine and densely crowded on abdominal terga 1–3 and on 6, but slightly more distinct and coarse on 4–5. *Color:* Black; wings subhyaline, veins and stigma brownish-ferruginous: tegulae piceous, becoming narrowly testaceous anteriorly; antennae, mandibles and legs black in general: spurs testaceous. *Pubescence:* Whitish over most of head and thorax, quite dense and rather long on face and clypeus, becoming shorter and more sparse and largely fuscous on vertex: white and rather long and dense on thorax laterally and beneath, but very short and largely fuscous on mesonotum and scutellum, with a line of dense creamy tomentum on mesonotum laterally and posteriorly, and a pair of similar narrow oblique lines anteriorly: white on legs, the front and mid tarsi with rather conspicuous posterior white fringes: abdominal terga 2–5 with entire whitish apical fasciae, discs of these segments with very short and inconspicuous but abundant fuscous hairs, those on the sixth whitish, becoming brown at tip; scopa entirely white.

Holotype, female. CORNELIO, SONORA, MEXICO. September 9, 1938 (R. H. Crandell). [University of Arizona.]

This species resembles *parksi*, *integra* and *brimleyi* in having the apical margin of the clypeus denticulate. These four can be separated by the following key:

1. Scopa black on fifth and sixth sterna.....*parksi* Mitchell
   Scopa largely or entirely pale on fifth sternum..... 2
2. Punctures of mesonotum very fine and densely crowded, becoming distinct only adjacent to notauli.....*crandalli* Mitchell, new species
   Punctures of mesonotum more coarse and distinct, with evident shining interspaces either medially or laterally..... 3
3. Punctures fine and close on mesonotum medially, becoming coarser and more widely separated laterally.....*integra* Cresson
   Punctures of mesonotum well separated medially as well as laterally.....*brimleyi* Mitchell

Megachile (Xeromegachile) pararubi Mitchell, new species

Female.—Size: Length 11 mm.; breadth of abdomen 4.5 mm.; anterior wing 7.5 mm.

Structure: Length of face somewhat less than distance between eyes above: eyes slightly convergent below; clypeal margin straight and entire: mandibles 4-dentate, a short cutting edge between third and inner teeth; basal segment of flagellum subequal to pedicel in length, second about equal to the first, following segments very slightly longer: lateral ocelli subequally distant from eyes and margin of vertex; cheeks subequal to eyes in breadth; hind metatarsi somewhat longer than the following segments combined, shorter but nearly as broad as the tibiae: apical margins of abdominal terga narrowly depressed, the more posterior segments deeply so; sixth tergum straight in profile, with no erect hairs visible, the surface on each side of the mid line somewhat concave, resulting in a condition somewhat similar to that in *Megachile rubi* Mitchell. *Sculpture:* Punctures rather fine but deep and very close over most of clypeus, apical margin medially shining

and impunctate; more distinctly separate but still close on face, fine and very close on vertex medially, becoming more distinctly separated laterally, very fine and close on cheeks, becoming slightly more coarse and distinct below; mesonotum rather dull, punctures deep and distinct but rather fine, quite close over most of disc, but slightly separated in center, those on scutellum quite deep and distinct, more close and coarse posteriorly, rather sparse in center anteriorly; fine and crowded on pleura above, becoming more coarse deep and distinct, but still close, below; very fine and densely crowded on the more basal abdominal terga, becoming somewhat more distinct but still very close on fourth and fifth, those on the sixth largely obscured by tomentum. *Color:* Black; wings subhyaline, veins and stigma fuscous; tegulae brownish, becoming testaceous anteriorly and piceous on inner margin; antennae, mandibles and legs black; spurs ferruginous. *Pubescence:* White over most of head and thorax, quite dense on face and clypeus and on thorax laterally, posteriorly and beneath, vertex with very short thin and somewhat darker hairs, and mesonotum very thinly pubescent, whitish and subappressed over apical half, more fuscous but very short and inconspicuous over posterior half, the lateral and posterior margins with dense whitish tomentum; scutellum largely pale pubescent; legs entirely white pubescent, the front and mid tibiae with rather conspicuous posterior fringes; abdominal terga 1–5 with entire, quite dense, whitish apical fasciae, pubescence of the discs very short and inconspicuous, but dark in general; sixth tergum with quite dense whitish tomentum, becoming brownish at tip; scope white, black on sixth sternum.

Holotype, female, EAST END OF ROOSEVELT LAKE, ARIZONA August 23, 1953 (G. D. Butler). Paratype, 1 female, topotypical. [University of Arizona.]

The chief differences between *pararubi* and the eastern species, *rubi,* are as follows:

M. rubi: Pubescence of mesonotum more elongate, erect and conspicuous, black over most of disc; punctures well separated in center of mesonotum; abdominal terga 2–5 with erect black pubescence, the apical fasciae very narrow, clear white.

M. pararubi: Pubescence of mesonotum very short, thin and inconspicuous, largely pale; mesonotum finely and very closely punctate throughout, punctures only slightly separated in center of disc; pubescence of terga 2–5 very short and inconspicuous, largely pale.

Megachile (Xeromegachile) pseudolegalis Mitchell, new species

Male.—Size: Length 11 mm.; breadth of abdomen 4 mm.; anterior wing 8 mm.

Structure: Face very slightly longer than distance between eyes above; eyes subparallel; mandibles quite robust, with a subapical tooth approximate to apical tooth, and a broad straight margin to inner angle, subbasal inferior projection narrowly rounded at tip; basal segment of flagellum slightly longer than broad, considerably longer than pedicel, apical segment slightly dilated and flattened; lateral ocelli considerably nearer eyes than to margin of vertex; cheeks somewhat broader than eyes; front coxal spines rather

short, subtriangular, with a patch of short reddish bristles at base; front femora somewhat dilated, carinate beneath medially; front metatarsi narrower than their tibiae, scarcely at all dilated or excavated anteriorly, second and following segments slightly narrower; apical margins of abdominal terga considerably depressed; carina of sixth tergum subtriangular, margin irregularly crenulate, median carinate teeth of apical margin of the tergum rather widely separated, lateral teeth acute but very short and obscure; seventh tergum with a rather slender and acute median spine; lateral portions of presternite of retracted fifth sternum subtriangular, apical rounded sclerites quite small, densely covered with whitish pubescence, median portion of presternite considerably narrowed, medasternite very broad and quite short, densely covered with short setae, the poststernal strip nearly straight medially, but slightly out-curved on each side, with a rather extensive tuft of short setae medially; lateral portions of presternite of sixth sternum with an apical tuft of rather long white hairs, medasternal areas densely covered with elongate recurved bristles, but these becoming much reduced on inner portions posteriorly, poststernal lobe about twice as broad as long, lateral angles narrowly produced and elongate; gonostyli of genital armature compressed apically, but tip somewhat thickened and rounded, bearing a quite strong tuft of recurved hairs, and with numerous hairs along inner surface toward base; penis valves very slightly exceeding gonostyli, somewhat flattened apically, volsellae quite robust, obliquely truncate apically. *Sculpture:* Punctures very fine and close on clypeus beneath beard and on face below ocelli, becoming somewhat more coarse but still very close on vertex and cheeks above, these becoming finely rugoso-punctate below; mesonotum and scutellum with densely crowded punctures laterally, these becoming somewhat more coarse, shallow and more widely separated in center, pleura with fine crowded punctures throughout; punctures very fine and close on basal abdominal tergum, close in general on second, but becoming more distinctly separated on 3–5, surface of sixth above carina irregularly and rather shallowly rugoso-punctate. *Color:* Black; wings subhyaline, veins and stigma piceous; tegulae brownish-piceous, with anterior margin more or less yellowish-hyaline; outer faces of front femora and tibiae blackish, upper and lower faces of femora more ferruginous, and inner surface of tibiae ferruginous, tarsi narrowly yellowish anteriorly, with hind margin rather broadly blackened and anterior margin narrowly so; mid and hind legs black; spurs testaceous. *Pubescence:* White and quite long and dense over most of head and thorax, but vertex with considerable fuscuous pubescence, and mesonotum with a median dark patch; front tarsal fringe with numerous black hairs beneath, hairs composing the fringe somewhat longer than width of tarsal segments, mid tarsal fringe entirely white and much longer; abdominal terga 2–5 with dense entire white apical fasciae, discs with numerous long erect hairs, largely white but with a few dark hairs interspersed on the fourth and fifth terga.

Holotype, male, FOUR MILES EAST OF NIGHTINGALE, RIVERSIDE COUNTY, CALIFORNIA, April 24, 1950 (C. D. MacNeill). [University of California.]

Megachile (Xeromegachile) macneilli Mitchell, new species

Male.—Size: Length 12 mm.; breadth of abdomen 4 mm.; anterior wing 8 mm.

Structure: Length and breadth of face subequal; eyes subparallel; mandibles rather robust, conspicuously 3-dentate, subbasal inferior projection acutely pointed; basal segment of flagellum rather slender, longer than pedicel, apical segment flattened and rather broadly dilated; lateral ocelli slightly nearer margin of vertex than to eyes; cheeks subequal to eyes in width; front coxal spines elongate triangular, acute, with a patch of reddish bristles at base; front femora rather broadly dilated, carinate beneath medially; front metatarsi slightly dilated, but somewhat narrower than their tibiae, anterior margin very slightly excavated, following joints successively narrower; apical margins of abdominal terga distinctly depressed, more so laterally; carina of sixth tergum obscurely and obtusely angulate medially, with a few irregular crenulations on each side, median teeth of apical margin of the tergum widely separated, carinate, lateral teeth very obscure; seventh tergum rather broadly triangular, not spined; lateral portions of presternite of retracted fifth sternum more quadrangular, with the latero-apical rounded sclerites covered with rather dense elongate pubescence, median portion of presternite narrow and elongate, medasternite quite extensive, broad, densely covered with very short setae, poststernal strip nearly straight, with a very slight median pencil of bristles; medasternal area of sixth sternum subtriangular, quite densely covered with elongate setae which are more or less recurved at tips, poststernal lobe broad and short, lateral angles produced and narrowly acute; gonostyli of genital armature compressed apically, with tips somewhat recurved, narrowly rounded and bearing a few elongate hairs, slightly exceeded by the rather robust penis valves; volsellae short, triangularly acute. *Sculpture:* Punctures of clypeus beneath beard very minute and well separated but not sparse, these becoming more coarse and close on face below ocelli, irregularly scattered and variable as to size between eyes and ocelli, becoming somewhat more coarse on margin of vertex, close over most of cheeks; fine and close on mesonotum laterally and anteriorly, becoming somewhat more coarse and rather widely separated medially, those on scutellum shallow but rather coarse and well separated; close and rather fine on pleura; fine and very close on basal abdominal tergum, but becoming more distinctly separated and slightly more coarse on the more apical segments, but very minute and irregular above carina on sixth tergum. *Color:* Black; wings subhyaline, veins and stigma piceous to brown-testaceous; tegulae brownish-piceous; outer face of front femora and tibiae black, but these otherwise reddish-testaceous, front tarsi more yellowish, with posterior margin slightly darkened; spurs reddish-testaceous. *Pubescence:* White and rather long and dense over most of head and thorax, but vertex and mesonotum medially with considerable fuscous pubescence, front tarsal fringe with numerous black hairs beneath, mid tarsal fringe elongate and entirely white; abdominal terga 1–2 entirely white pubescent, terga 2–5 with dense entire white apical fasciae, discs of 3–5 with numerous erect black hairs in addition to some more or less whitish pubescence; sixth dorsally largely covered with thin pale tomentum.

Holotype, male, FOUR MILES EAST OF NIGHTINGALE, RIVERSIDE COUNTY, CALIFORNIA, April 24, 1950, (C. D. MacNeill). [University of California.]

Megachile (Xeromegachile) stoddardensis Mitchell, new species

Male.—Size: Length 6 mm.; breadth of abdomen 2 mm.; anterior wing 5 mm.

Structure: Length and breadth of face subequal; eyes very slightly convergent below; mandibles 3-dentate apically, basal inferior dilation triangularly acute; basal segment of flagellum subequal to pedicel, apical segment somewhat dilated; lateral ocelli subequally distant from eyes and margin of vertex; cheeks subequal to eyes in width; front coxal spines rather slender, with a small tuft of yellowish bristles at base; front femora somewhat dilated, carinate beneath apically; front metatarsus slender, scarcely dilated, but second segment somewhat flattened and dilated, being no broader however than metatarsus; apical margins of abdominal terga considerably depressed toward sides; carina of sixth tergum broadly triangular, the margin smooth and straight on each side of the median obtuse angle; apical margin of sixth tergum with a pair of broadly carinate median teeth, lateral teeth hardly evident; seventh tergum with a rather short but distinct and slender median spine; presternite of retracted fifth sternum broadly triangular on each side, much narrowed medially, with a rounded short pubescent apical sclerite on each side, metasternal area broadly ovoid, densely covered with short dilated setae, the poststernal strip nearly straight, with a very short median pencil of setae; medasternal areas of sixth sternum densely covered with more elongate setae which are in part slightly reflexed at tip, the poststernal lobe broad and quite short, somewhat angulate on each side; gonostyli of genital armature rather slender, somewhat recurved and narrowly rounded at tip, bearing a few whitish hairs apically, penis valves slender, slightly exceeding gonostyli, volsellae short, triangularly acute. *Sculpture:* Face and clypeus hidden by dense pubescence, punctures of vertex and cheeks above rather fine but well separated, becoming almost crowded below, punctures on mesonotum and scutellum distinct, rather deep but fine, close laterally, becoming rather widely separated medially; pleura closely punctate; abdominal terga shining, punctures very fine, well separated but hardly sparse, becoming rather close and somewhat more coarse on sixth tergum above the carina. *Color:* Black, wings hyaline, veins and stigma ferruginous to piceous; tegulae testaceous; front tarsi pale testaceous, metatarsus slightly blackened on both margins, legs otherwise black but the apical tarsal segments somewhat reddened on mid and hind legs; spurs yellowish. *Pubescence:* Largely white and rather dense on head and thorax, but vertex with a few dark hairs, and front metatarsi with a few dark hairs beneath the posterior fringe which is somewhat broader than width of the joint; abdominal terga 1–5 with entire and rather dense white apical fasciae, discs with rather abundant erect whitish pubescence.

Holotype, male, STODDARD MOUNTAIN, SAN BERNARDINO COUNTY, CALIFORNIA, April 28, 1949. (Linsley, McSwain, and Smith.) [University of California.]

This species resembles superficially *Megachile (Derotropis) astragali* Mitchell, but in that species the front tarsi are entirely black, with the metatarsi much shorter than those in *stoddardensis*. In addition to other minor differences, the seventh tergum in *astragali* is not so distinctly spinose as in this species.

The following key to males separates the newly described species from the other species of *Xeromegachile* and *Derotropis* having unmodified anterior tarsi:

1. Distance between lateral ocelli and posterior margin of vertex much exceeding that between lateral ocelli and inner margin of eye (ratio about 3:2) 2
   Distance between lateral ocelli and posterior margin of vertex only slightly exceeding that between ocelli and eyes, if at all 3
2. Mandibles 3-dentate; legs more or less ferruginous ..... *deflexa deflexa* Cresson
   Mandibles 4-dentate; legs dark ..... *deflexa coreopsana* Mitchell
3. Front tarsi entirely black or piceous 4
   Front tarsi yellowish, at least in part 5
4. Larger (11–12 mm.); mesonotum dull, densely tessellate, punctures inevident ..... *mucorosa* Cockerell
   Smaller (8 mm.); mesonotum shining between the deep and distinct punctures ..... *astragali* Mitchell
5. Front tarsal fringe composed in part of black hairs 6
   Front tarsal fringe composed entirely of yellowish or white hairs 8
6. Smaller (7 mm.); pubescence of mesonotum entirely pale ..... *stoddardensis* Mitchell, new species
   Larger (11–12 mm.); mesonotum with a patch of fuscous hairs 7
7. Median mandibular tooth approximate to the apical tooth, with a wide space separating it from the inner angle; clypeus finely and densely punctate beneath the dense white beard ..... *pseudolegalis* Mitchell, new species
   Median mandibular tooth only slightly nearer the apical tooth than to the inner angle; clypeus smooth and shining, the punctures minute and obscure, beneath the dense white beard ..... *macneilli* Mitchell, new species
8. Pubescence of vertex and mesonotum entirely pale; mesonotum dull, densely tessellate, punctures in center of disc shallow and obscure ..... *legalis* Cresson
   Vertex or mesonotum with some darker hairs; punctures of mesonotum medially deep and distinct, interspaces not so densely tessellate 9
9. Apical margin of third abdominal tergum, as well as that of the fourth and fifth, abruptly and deeply depressed; hairs of vertex largely pale, those of mesonotum somewhat darker in center of disc ..... *dakotensis* Mitchell

Apical margin of third abdominal tergum not depressed medially; vertex with intermixed blackish and yellowish hairs, mesonotum with a large central blackish patch.....*integrella* Mitchell

MEGACHILE (DEROTROPIS) SUBANOGRAE Mitchell

The possibility has been suggested (Mitchell, 1944:139) that *M. (Xeromegachile) maurata* Mitchell is the male of *M. (Derotropis) subanograe*. Additional records of these collected at the same time and place, and on the same host plant, would seem to make this almost conclusive. It remains to discover the nesting sites while the males are still in flight to prove this relationship. The female *(subanograe)* was described as belonging in the subgenus *Megachiloides* (Mitchell, 1934:344), but was later transferred to *Derotropis* when that subgenus was described (Mitchell, 1936:156). The male *(maurata)* was described later (Mitchell, 1937:369), and in the subgenus *Xeromegachile*.

Following are California records of males and females collected together: Piñon Flat, San Jacinto Mountains, May 18, 1939 (Ross & Linsley, on *Sphaeralcea ambigua*); Ribbonwood, San Jacinto Mountains, May 21, 1940 (Michener). Additional males were collected at Mohave, Kern County, April 24, 1919 (C. D. MacNeill) and Westgard Pass, Inyo County, June 19, 1953 (J. W. MacSwain, on *Encelia*). A female was collected at Lee County, Nevada, May 25, 1940 (G. E. Bohart).

Previous state records include Wyoming (type locality), Texas, California, Utah and Nevada, May–July.

MEGACHILE (DEROTROPIS) ASTRAGALI Mitchell

The type series of four males and one female was collected in the Mohave Desert (Mitchell, 1938:177). Following are some additional California records: 2♂♂, Yermo, San Bernardino County, April 28, 1949 (Linsley, MacSwain & Smith); 1♂, Kramer Junction, San Bernardino County, April 30, 1953 (R. O. Schuster); 1♂, Victorville, San Bernardino County, May 2, 1953 (G. A. Marsh); and 1♂, 2 miles north of Kramer Junction, April 30, 1953 (P. H. Timberlake).

The following records appear to be new for each of the respective states. New locality records within the previously known range are not included.

MEGACHILE (XEROMEGACHILE) ALATA Mitchell

Arizona: 1♀, Tucson, May 17, 1954 (Butler, on *Prosopis*). Also collected in April on California Poppy. Recorded previously from California.

MEGACHILE (XEROMEGACHILE) BRADLEYI Mitchell

California: 5 ♀♀, Antioch, September (G. E. & R. M. Bohart: 1936) (P. D. Hurd: 1947 and 1949). Previously recorded from Utah and Nevada, September.

MEGACHILE (XEROMEGACHILE) CASADAE Cockerell

California: 1 ♂, Borego, San Diego County, April 5, 1940 (R. M. Bohart). Arizona: 1 ♀, Oracle, May 6, 1951 (Butler); 1 ♀, Oak Creek Canyon, May 28, 1954 (Butler, on *Opuntia*). Previously recorded from Colorado, Oklahoma, Texas, Utah, Nebraska, New Mexico, South Dakota and Wyoming.

MEGACHILE (XEROMEGACHILE) INSTITA Mitchell

California: 1 ♂, Susan River Camp, Lassen County, July 10, 1949 (Ehrhardt). Arizona: 1 ♂, Ray, May 18, 1954 (Werner, on *Acacia*). Recorded previously from New Mexico and from Sonora, Mexico.

MEGACHILE (XEROMEGACHILE) MOJAVENSIS Mitchell

Arizona: May, on *Aster*. Previously recorded only from California.

MEGACHILE (XEROMEGACHILE) MUCOROSA Cockerell

Arizona: 1 ♂, Pearce, July 27, 1954 (Butler & Werner, on *Helianthus*). Recorded previously from Colorado, Kansas, Texas and Nebraska.

MEGACHILE (XEROMEGACHILE) NEVADENSIS Cresson

The collection of a male in Louisiana extends the known range of this species considerably to the east. Previously, none of this species has been recorded east of New Mexico. The record is as follows: 1 ♂, Winnfield, Louisiana, May 12, 1918 (H. C. Fall). Previous State records include California, Oregon, Washington, Idaho, Nevada, Utah, New Mexico, and Wyoming.

MEGACHILE (XEROMEGACHILE) PALMENSIS Mitchell

Arizona: 1 ♀, Oracle, May 6, 1951 (G. D. Butler). Recorded previously from California.

MEGACHILE (XEROMEGACHILE) SUBNIGRA ANGELICA Mitchell

Arizona: 1 ♂, B. Thompson Arbor, Superior, May 3, 1953 (G. D. Butler, on *Aster*). Recorded previously from California, Oregon and Idaho, April–June.

MEGACHILE (XEROMEGACHILE) SUBNIGRA SUBNIGRA Cresson

Utah: 1 ♀, Navajo L., June 17, 1940, 9,000 feet (R. M. Bohart). Recorded previously from California, Oregon, Washington, Idaho, Nevada and Wyoming.

MEGACHILE (DEROTROPIS) ANOGRAE Cockerell

Kansas: 1 ♀. Wallace County. July 11. Recorded from Colorado. Nebraska. Texas. Montana. Oregon and California. April–July.

MEGACHILE (DEROTROPIS) MELANDERI Mitchell

California: 1 ♀. Westgard Pass. Inyo County. June 18. 1942 (R. Bohart). This is the only specimen. other than the type. so far found in any of the collections sent in for determination. The type locality is Marfa. Texas (Mitchell. 1944:140).

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1944. New species and records in Megachile. Pan-Pacific Ent.. 20:132–143.

THE ALBIZZIA PSYLLID. PSYLLA UNCATOIDES (FERRIS & KLYVER). IN CALIFORNIA

(Homoptera: Psyllidae)

D. D. JENSEN

University of California, Berkeley

In April. 1955. J. Duncan Graham found a heavy infestation of psyllids on his ornamental trees. *Albizzia julibrissin* Durazz.. at Benicia. California. Specimens were submitted to the writer for identification. The species proved to be *Psylla (Psyllia) uncatoides*. described by Ferris and Klyver (1932) and known previously only from New Zealand. The species is being retained in the genus *Psylla* despite the proposal by Heslop-Harrison (1949) that it be included in the genus *Acizzia* Heslop-Harrison. 1951 (=*Neopsylla* Heslop-Harrison, *nec* Wagner, 1903).

Infestations of *Psylla uncatoides* were found in Berkeley soon after the discovery at Benicia and suggested that the species was already well established in the area. The California Department of Agriculture was informed of the presence of this immigrant psyllid and a quick survey conducted by State inspectors revealed the species to occur on *Acacia* and *Albizzia* in the coastal region of California from Sonoma County south to San Diego County (Armitage. 1955). Subsequently. a nymph. collected on *Acacia* sp. at

Belmont, San Mateo County, January 22, 1954, by Dave Bingham, was identified by the writer as *Psylla uncatoides*. Although this record establishes the presence of the Albizzia psyllid in California more than a year before the species was first identified as being here, its wide distribution in the state indicates that it has been here for a number of years. During 1956, the California Department of Agriculture survey recorded this psyllid from Riverside, San Bernardino and Merced Counties in addition to the coastal counties.

The type specimens were collected on *Acacia melanoxylon* R. Br. in New Zealand. Through the courtesy of Professor G. F. Ferris, the writer was able to examine some of these specimens, mounted on slides, in the Entomology Collection of Stanford University. Tuthill (1952) collected the species in New Zealand on *Acacia verniciflua* A. Cunn. and *Albizzia lophantha* Benth.

Acacia and *Albizzia* are native to Australia but not to New Zealand, presumably being introduced into the latter islands by man. It can thus be inferred that the psyllids breeding on these hosts in New Zealand were also introduced from Australia. Curiously, however, *Psylla uncatoides* and several related species breeding on *Acacia* and *Albizzia* in New Zealand are as yet unrecorded from Australia.

In California *Psylla uncatoides* has been found breeding on *Albizzia julibrissin*, *A. lophantha* and *Acacia melanoxylon*. It becomes very abundant on its host plants and the nymphs produce enough honeydew to be objectionable when it drips down on garden furniture beneath the infested trees. This secretion is also a medium on which sooty mold will develop. The Albizzia psyllid nymph does not produce a waxy cell over its body as do some of the lerp psyllids of Australia.

Literature Cited

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1955. Current insect notes. Calif. Dept. Agr. Monthly Bul. 54:164–166.

Ferris, G. F. and F. D. Klyver
1932. Report upon a collection of Chermidae (Homoptera) from New Zealand. New Zeal. Inst. Trans. 63:34–61.

Heslop-Harrison, G.
1949. A new Indo-Malayan genus and species of the family Psyllidae (Hemiptera-Homoptera). Ent. Monthly Mag. 95:161–164.

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1952. On the Psyllidae of New Zealand. (Homoptera). Pacific Science 6:83–125.

HARRY PHYLANDER CHANDLER

(1917 – 1955)

When a man's friends have gone before him, and a new generation shows little interest in his passing, it is said that he has outlived his time. At the other extreme was Harry Chandler, who died at 37 with difficult times behind him and his research work just coming to fruition.

Harry P. Chandler was born on July 10, 1917, at Richland, Oregon. His parents, Eagle and Marie (Kendall) Chandler had a farm nearby. When Harry was only four his father died, and his mother eventually moved to Provo, Utah. There he graduated from high school and entered Brigham Young University in the fall of 1935. Taking his major work in the Department of Zoology and Entomology he received his bachelor of arts degree in 1939, and a master of arts in 1941. Following that he registered for graduate studies at the Berkeley campus of the University of California, and began work for a Ph.D. This was interrupted by enlistment in the Navy.

During the war he was a gunnery and torpedo officer on a destroyer, serving part time in the South and part in the North Pacific. At every opportunity he collected insects, especially aquatic beetles. Specimens in his collection show that he was in New Guinea (Oro Bay, May, 1944: Hollandia, November, 1944); the Admiralty Islands (Manus Island, April, 1944); the Solomon Islands (Florida Island, April, 1944); Australia (Sydney, March, 1943); and the Aleutian Islands (Adak Island, August, 1943). He was in the Aleutians again in 1945, when he botanized on Attu, Adak, and Great Sitkin islands; the plants he later gave to the herbarium of the California Academy of Sciences ". . . 135 species that are beautifully pressed so that the colors are preserved."[1]

Harry was in the Navy for three years; towards the end of that time he requested that he be put in a Malarial Control Unit, and was just being transferred to that branch when the war ended. He attained the rank of Lieutenant, J.G.

Upon leaving the Navy he continued his graduate studies, and held a Research Assistantship at Berkeley. Working under Dr.

[1] Eastwood, Alice. A collection of plants from the Aleutian Islands. Leaflets of Western Botany, 5 (1):9-13. 1947.

R. L. Usinger, he put his field and laboratory knowledge to use as an active co-author of a syllabus for a new course in the biology of aquatic and littoral insects.

In July, 1947, he accepted a position with the California Department of Fish and Game, being stationed for the first year in the San Francisco office. On January 1, 1948, Harry married La June Dunn, a graduate in entomology from the University of Kansas, whom he had met at the University of California. That summer he was transferred to Red Bluff, and there made his home —literally, with his own hands, working long hours in the evenings, on holidays, and week-ends, ably assisted by his wife.

A hard, steady worker, physically strong, thoroughly reliable, he found in the Department of Fish and Game a career which he really enjoyed. With a house built, adequate collections on hand, and some actual spare time, he could look forward to his hobby, research on the taxonomy and biologies of aquatic insects. Until then he had worked chiefly in the Coleoptera, but was becoming more and more interested in neuropteroid groups, especially the corydalid Megaloptera. Of these he had what is perhaps the largest collection in North America, was actively rearing local species, and envisioned a monographic treatment of the family. Observant, and a logical thinker, he was remarkably good at recognizing species from original descriptions. He preferred to work alone, but was most co-operative in loaning specimens and answering questions.

At this point came tragedy. Cancer of the tongue was diagnosed in November, 1953, and he immediately underwent major surgery. For a while he seemed to be doing well, and returned to his full duties, but later was hospitalized, and died on April 16, 1955. He was buried at Golden Gate National Cemetery, San Bruno, California. Harry is survived by his wife La June, by four children, Donald Stewart, Carol Ann, Clare David, and Mary Louise, and by his mother and sister of Richmond, California.

Following his request, his collections of insects and fresh water and marine shells have been given to the California Academy of Sciences, San Francisco. Of insects there are, in addition to numbers of larval and adult forms in alcohol, 22,737 well mounted and fully labeled specimens, 77% of which are beetles. Emphasis is on aquatics, but there is a well-rounded coverage of families.

—Hugh B. Leech.

ENTOMOLOGICAL PUBLICATIONS OF H. P. CHANDLER

1941. New species of Coleoptera from Utah (Omophronidae and Dytiscidae). Breat Basin Nat., 2(2):99–104, 16 text figs.

1943. A new genus of Haliplidae (Coleoptera) from California. Pan-Pacific Ent., 19(4):154–158, 7 text figs.

1948. (With R. L. Usinger, I. La Rivers, and W. W. Wirth) Biology of aquatic and littoral insects. Entomology 133 *in*: Univ. Calif. Syllabus Series, Syllabus SS, University of California Press, Berkeley and Los Angeles. ii+144 pp. (H.P.C. contributed chiefly to the sections on Coleoptera and Trichoptera. This syllabus was issued on March 8, 1948.)

1949. A new species of Stenelmis from Nevada (Coleoptera, Elmidae). Pan-Pacific Ent., 25(3):133–136, 1 text fig.

1953. A new species of Climacia from California (Sisyridae, Neuroptera). Jour. Washington Acad. Sci., 43:182–184.

1954a. Four new species of dobsonflies from California (Megaloptera: Corydalidae). Pan-Pacific Ent., 30(2):105–111, 10 text figs.

1954b. New genera and species of Elmidae (Coleoptera) from California. Pan-Pacific Ent., 30(2):125–131, 3 text figs.

1956. (*in*: Aquatic insects of California, with keys to North American genera and California species. Edited by Robert L. Usinger. x+508 pp., 501 text figs., nearly all compound. University of California Press, Berkeley and Los Angeles. Published September 10, 1956.) By H.P.C., Chapter 8, Megaloptera, pp. 229–233, 7 figs.; Chapter 9, Aquatic Neuroptera, pp. 234–236, 5 figs.; and, with H. B. Leech, Chapter 13, Aquatic Coleoptera, pp. 293–371, 61 figs.

SOME SPECIES OF INSECTS NAMED FOR H. P. CHANDLER

TRICHOPTERA

Rhyacophila chandleri Denning, 1955.

Anagapetus chandleri Ross, 1951.

PLECOPTERA

Alloperla chandleri Jewett, 1954

COLEOPTERA

Bagous chandleri Tanner, 1943.

A NEW SPECIES OF CALLIDIUM FROM JUNIPER

(Coleoptera: Cerambycidae)

E. GORTON LINSLEY

University of California, Berkeley

The following species was recorded by Hopping (1925) as *Callidium californicum* Casey (1912). However, comparison with the type of Casey's *californicum* has revealed that it is quite different from that species.

Callidium hoppingi Linsley, new species

Male.—Form moderate-sized, broad, elytra broadly explanate from behind

humeri, widest a little in front of middle; integument dark brown, upper surface blue-violet; pubescence coarse, dark. *Head* coarsely punctate; antennae dark brown, reaching to about middle of elytra. *Pronotum* nearly one and one-half times as wide as long, narrower than elytra at base, sides broadly rounded to base, widest behind middle, base narrowly constricted, disk shining, moderately coarsely, irregularly shallowly punctate, sides more finely densely punctate; prosternum less densely punctate than pronotum at sides; metasternum finely punctate, finely transversely rugulose, thinly pubescent. *Elytra* twice as long as basal width, greatest width about one-sixth wider than basal width; surface shining, densely, coarsely, rugosely punctate, the punctures larger posteriorly; apices broadly rounded to suture which is obtusely angulate. *Legs* moderate; posterior femora not attaining elytral apices, shining, sparsely punctate, thinly pubescent. *Abdomen* finely not closely punctate, thinly pubescent; fifth sternite shorter than fourth, broadly shallowly emarginate at apex. Length, 9.5 mm.

Female.—Antennae extending over basal one-third of elytra; prosternum shining, finely rugulose; abdomen with fifth sternite longer than fourth, apex narrowly rounded. Length, 10 mm.

Holotype male, allotype female, and sixty paratypes (Calif. Acad. Sciences, Entom.) from CANYON HOUSE, ABOUT THIRTY MILES WEST OF PRINCETON, BRITISH COLUMBIA (NEAR THE INTERNATIONAL BOUNDARY) reared from *Juniperus scopulorum* (Experiment 17102) on various dates from March through June, 1923 (Ralph Hopping). These are part of a series of 373 specimens reared from three pieces of wood from three to four inches in diameter and about three feet long (Hopping, 1925). Additional specimens are at hand from the same locality and host plant from March to June, 1932 (Ralph Hopping collection, Calif. Acad. Sciences). Paratypes in the Canadian National Collection and the California Insect Survey.

This species is closely related to *Callidium frigidum* Casey from eastern Canada and the Atlantic states, which has similarly broadly explanate elytra. However, in *C. hoppingi* the elytra are widest at or in front of the middle, the pronotum is less densely punctate, the elytra are blue-violet or, less commonly, greenish-blue, and the antennae proportionately shorter.

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1925. *Juniperus scopulorum* as a host. Canadian Ent., 57:105–106.

CASEY, T. L.
1912. Memoirs on the Coleoptera, 3:289.

BARK-BEETLES AND PIN-HOLE BORERS RECENTLY IMPORTED INTO JAPAN WITH TIMBERS FROM THE UNITED STATES AND OTHER FOREIGN COUNTRIES

(Coleoptera)

J. J. MURAYAMA[1]

Since the beginning of World War II, the Japanese people have cut large numbers of trees for war uses, for reconstruction of bombarded buildings, and to control bark-beetles which damaged enormously the pine forests of Japan. The veneer and plywood manufacturing industries have also been rapidly extended. Because of the naturally insufficient forest resources and the large volume of wood materials required, timber supplies are supplemented by importation from foreign lands, chiefly from the United States, Dominion of Canada, the Philippines, Borneo and Siberia. As would be expected, these timbers transport with them numerous specimens, living and dead, of many species of insects of the families *Platypodidae, Ipidae, Bostrichidae* and *Curculionidae*.

Over several years, the writer collected these beetles from timber floating on the sea surface of the imported ports and was also supplied intercepted specimens from the Plant Quarantine Officers at the cities of Yokohama, Shimidzu, Osaka, Kobe and Nagoya. With the help of Dr. W. H. Anderson, and Mr. T. Spilman of the U.S. Department of Agriculture, and Dr. S. L. Wood of Brigham Young University, this material has been carefully determined and compared with specimens in the U.S. National Museum, Washington, D.C. Unfortunately the determination of many specimens from the Philippines and Borneo, mostly *Platypodidae* and *Xyleborinae* had to be postponed because of insufficient time, however, all the species from America and Siberia have been identified and are listed in this paper.

Whether or not these adventives may become established in a new environment is a problem of future concern. Since cases of introduction and establishment have already been found in Europe and America, a knowledge of the species being transported to Japan over the sea and the continents is at present time considered to be of primary importance.

Many tropical species inhabiting the Philippines and

[1] Present address: U.S. National Museum, Washington 25, D.C.

Borneo. and Ceylon and Madagascar are now found in Japan. These were probably transported to Japan in the past over long period of time by typhoons, by the Japan Current. and by human agencies. They should be studied from the standpoint of the protection of forests of every country in the world. The writer has published opinions and data on the problem.[2] Such studies will give light also in the solution of the present problem.

List of Species of Insects and Trees. with the Ports concerned:

Subfamily and Species of Insects	Port Exported	Port Imported	Species of Trees	Year
Scolytinae	*By Airplane*			
Scolytus dimidiatus Chapius	Peru	Haneda	Barboso root	1952
Hylesininae	*By Steamer*			
Phloeosinus nitidus Swaine	Tacoma	Osaka	Yellow cedar	1954
Blastophagus khasianus Beeson	Philipp. Basilan	"	Lauan	1951
Dendroctonus engelmanni Hopkins	Eureka	"	Douglas fir	1954
"	"	Yokohama	Fir	1952
Dendroctonus pseudotsugae Hopkins	Tacoma	Osaka	Douglas fir	1954
"	"	"	"	1953
"	"	"	"	1952
"	Portland	Nagoya	"	1951
"	Vancouver	Yokohama	"	1952
"	Tacoma	Nagoya	"	1953
Hylurgops rugipennis (Mannerheim)	Grays Hbr	Kobe	Spruce	1953
Crypturginae				
Dolurgus pumilus (Mannerheim)	"	Yokohama	Hemlock	1951
Polygraphinae				
Polygraphus subopacus Thompson	Nazarev	Shimidzu	Spruce	1954
Xyloterinae				
Xyloterus retusus LeConte	Tacoma	Kobe	Cottonwood	1953
Xyloterus rufitarsis Kirby	Grays Hbr	"	Spruce	1953

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[2] On the distribution of Scolytid-beetles by human agency. Kontyu, Vo. X, no. 3(1936), p. 113-120.

On the Scolytid beetles importing at present with Lauan wood and the controlling measures against them. Plant Protection, no. 19(1950). p. 13-21.

Xyloterus carvifrons Mannerheim	"	"	Hemlock	1955
Xyloterus ponderosae Swaine	Portland	Yokohama	Western cedar	1953
Pityophthorinae				
Gnathotrichus retusus LeConte	Stockton San Fran.	"	Frame for rice trans.	1953
"	Grays Hbr	"	Hemlock	1953
"	Portland	"	Douglas fir	1951
Gnathotrichus sulcatus LeConte	Eureka	Shimidzu	White fir	1953
"	Cross Bay	Nagoya	Douglas fir	1948
"	Eureka	Osaga	"	1954
Ipinae				
Ips interruptus (Mannerheim)	Willock Astoria	Hakodate	Hemlock Fir	1954
"	Long View	Nagoya	Spruce	1944
Ips concinnus (Mannerheim)	"	"	"	1944
Ips typographus (Linnaeus)	Nazarev	Shimidzu	"	1955

Subfamily and Species of Insects	Port Exported	Port Imported	Species of Trees	Year
Xyleborinae				
Xyleborus validus Eichhorn	Long View	Yokohama	Pine	1955
Xyleborus fleuteauxi Blandf.	Philipp.	Nagoya	Lauan	1954
"	"	Osaka	"	1954
Platypodidae				
Platypus wilsoni Swaine	Eureka	Nagoya	Apiton	1954
Playpus schultzei Strohmein	Philipp.	Osaka	Paulonia	1951
	" Basilan			
Platypus biuncus Blandf.	" Nsipit	"	White fir	1951
Playpus solidus Walker	" Camarives	"	Lauan	1951
Crossotarus simplex Murayama	Formosa	"	"	1954
Bostrichidae				
Xylothrips flavipes (Illiger)	Philipp.	"	Lauan	1951
"	" Isabera	"	"	1951
"	" Gingoog	"	"	1951
"	" St. Musia	"	"	1951
"	" Basilan	"	"	1951
"	" Sta Ana	"	"	1951
"	" Butuan	"	"	1951
Heterobostrychus aleajahi (Waterhouse)	" Appari	"	"	1951
	" Isabela	"	"	1951
"	" Basilan	"	"	1951
Bitoma parallela Sup.	" Butuan			

ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.(N.S.)33)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in an application relating to the undermentioned name included in Part II of Volume 12 of the *Bulletin of Zoological Nomenclature*, which will be published on 30th November, 1956.

Notice is also given that the possible use of those Powers is involved in applications included in Part 12 (the final Part) of Volume 11 of the same publication which will be issued on the same date.

(1) Application in Part 11 of Volume 12

(1) PIERIDAE Duponchel, 1832, validation of family-group name (Class Insecta, Order Lepidoptera) (Z.N.(S.)289).

(2) Applications in Part 12 of Volume 11

(2) *Ptychopyge* Angelin, 1854, designation of a type species for, in harmony with accustomed usage (Class Trilobita) (Z.N.(S.)997);

(3) *convexa* de Haan, [1835] (*Ocypode* (*Chasmagnathus*)), validation of (Class Crustacea, Order Decapoda) (Z.N.(S.)984).

2. The present Notice is given in pursuance of the decisions taken on the recommendation of the International Commission on Zoological Nomenclature, by the Thirteenth International Congress of Zoology, Paris, July 1948 (see *Bull. Zool. Nomencl.* 4:51–56, 57–59; *ibid* 5:5–13, 131).

3. Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice, and sent *in duplicate*.—FRANCES HEMMING, *Secretary to the International Commission on Zoological Nomenclature.*

A NOTE ON THE NESTING HABITS OF POMPILUS (AMMOSPHEX) OCCIDENTALIS (DREISBACH)

(Hymenoptera: Pompilidae)

JERRY A. POWELL
University of California, Berkeley

On August 5, 1956, a single female of *Pompilus occidentalis* (Dreisbach)[1] was observed occupied in its nesting activities in Calaveras County, California. The locality, about two miles south of Big Meadows, is in the basin of the north fork of the Stanislaus River at an approximate elevation of 6500 feet. The composition of the valley floor in this region consists principally of a pine forest with very little undergrowth.

At approximately 1:55 P.M. Pacific Daylight Saving Time, in a dry wash sparsely shaded by pines, the wasp was first seen with its prey. The spider has subsequently been determined as *Pardosa* sp. (Lycosidae) by Dr. Willis J. Gertsch of the Department of Insects and Spiders, American Museum of Natural History. The wasp was walking backward, dragging the spider by one of its legs. Shortly thereafter the prey was placed about one centimeter above the ground, lodged in a small tuft of grass, and abandoned. The wasp then began to fly quickly about the immediate vicinity, staying close to the bare, sandy soil, and alighting frequently to move short distances among the numerous pebbles and small rocks. This behavior continued for about six minutes, during which the wasp made several irregular circles around the position of the immobile spider. At length a spot some 39 cm. from the prey was selected, and the female wasp quickly cleared the twigs, needles and pebbles from a small area adjoining a short stick.

At 2:02 P.M. the female began to dig, worked rapidly, and then did not leave the deepening hole, except to bring up dirt occasionally. This activity lasted 18 minutes. Periods of digging were interspersed with those of rapid raking, the wasp backing out of its burrow and scraping the loose material from the tunnel entrance with its front legs. Finally she came up, went immediately to the spider and hurriedly dragged it to the excavation site. After placing it about three centimeters from the hole, the wasp proceeded to inspect the entrance before bringing the prey to the burrow. There, once again the paralyzed Arachnid was abandoned:

[1] Determination by Marius S. Washauer, Department of Entomology, University of California, Berkeley.

this time while the female disappeared into the tunnel for a few seconds. At 2:22 the wasp backed down the burrow again, this time dragging the spider in. Three minutes later the busy Pompilid reappeared, pulling the loose sand left about the entrance into the hole. She then continued to replace and pack the soil until the tunnel was filled completely. Following this, nearby pine needle fragments and pebbles were kicked over the excavation area until no trace of the digging activity was in evidence. At 2:28 P.M. as this process appeared finished, the wasp was captured.

Upon a digging inspection, the tunnel was found to be 20 mm. in length, slanting into the soil at approximately a 45 degree angle. At the base of the completely packed entrance was a loose, oval cell, 8 mm. in length, which contained the spider. The spider was situated in the cell in a ventral side down, head in first position. A smooth, white, elongate egg of 2 mm. in length had been placed diagonally in a lower, lateral position near the middle of the prey's abdomen. The spider was kept alive for about eight hours without showing any signs of reviving, after which it was placed in alcohol.

It is interesting to note that as far as is known there are no previous reports on the nesting habits of any of the members of the subgenus *Ammosphex* in North America. Prey associations, however, have been listed by Evans[2] for *P. Ammosphex solonus solonus* (Banks), collected with a *Lycosa* sp. and *P. Ammosphex michiganensis dakota* (Dreisbach), pinned with a *Thanatus formicinus* (Oliver).

[2] Evans, Howard E., 1951. A Taxonomic study of the nearctic spider wasps belonging to the tribe Pompilini (Hymenoptera:Pomoilidae) Part III. Trans. Amer. Ent. Soc. 77:203-304.

ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.(N.S.)31)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Part 1 of Volume 13 of the *Bulletin of Zoological Nomenclature*, which will be published on 25th January, 1957:

(1) *Bithys* and *Chrysophanus* Hübner, 1818 (generic names of neotropical Theclids), suppression of (Class Insecta, Order Lepidoptera) (Z.N.[S.]802);

(2) *Cephalomutilla* André, (1908), designation of a type species for, in harmony with accustomed usage (Class Insecta, Order Hymenoptera) (Z.N.(S.)902).

The present Notice is given in pursuance of the decisions taken on the recommendation of the International Commission on Zoological Nomenclature, by the Thirteenth International Congress of Zoology, Paris, 1948 (see *Bull. Zool. Nomencl.* 4:51–56, 57–59; *ibid* 5:5–13, 131).

Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1.) as soon as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice, and sent *in duplicate*. —FRANCIS HEMMING, *Secretary to the International Commission on Zoological Nomenclature.*

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ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF THE PLENARY POWERS IN CERTAIN CASES FOR THE AVOIDANCE OF CONFUSION AND THE VALIDATION OF CURRENT NOMENCLATORIAL PRACTICE (A.N.S.)32)

Notice is hereby given that the possible use by the International Commission on Zoological Nomenclature of its Plenary Powers is involved in applications relating to the under-mentioned names included in Part 10 of Volume 12 of the *Bulletin of Zoological Nomenclature*, which will be published on 31st October, 1956:

1. *Cupido* Schrank, 1801, designation of a type species for, in harmony with accustomed usage (Class Insecta, Order Lepidoptera) (Z.N.(S.) 1138);
2. *jurtina* Linnaeus, 1758 (*Papilio*), grant of precedence to, over *janira* Linnaeus, 1758 (*Papilio*): EPINEPHELDI Tutt, 1896, suppression of (Class Insecta, Order Lepidoptera) (Z.N.(S.)1142).

Attention is also drawn to the proposed adoption of a *Declaration* regarding the method to be followed in determining the relative precedence to be accorded to two or more names for family-group taxa published in the same book and on the same date (Z.N.(S.)1141).

Any specialist who may desire to comment on any of the foregoing applications is invited to do so in writing to the Secretary to the International Commission (Address: 28 Park Village East, Regent's Park, London, N.W.1, England) as soon

as possible. Every such comment should be clearly marked with the Commission's File Number as given in the present Notice. and sent *in duplicate*.—FRANCIS HEMMING. *Secretary to the International Commission on Zoological Nomenclature.*

BOOK REVIEW

AQUATIC INSECTS OF CALIFORNIA: With Keys to North American Genera and California Species. Edited by ROBERT L. USINGER. University of California Press. Berkeley and Los Angeles. 1956. ix + 508 pp., ill. $10.00.

This fine large book should be invaluable, not only to all entomologists, regardless of region, but also to any biologist concerned with aquatic environments. Its use as a means of identifying the aquatic insects of California is obvious. Of more far-reaching importance is its contribution to the advancement of basic knowledge of each of the insect groups concerned. Certain chapters represent the first compilations of information on these groups, many of which are comprehensively treated because of their confinement to aquatic habitats.

Dr. Usinger introduces aquatic entomology with general background on the ecology and applied aspects of water environments. This is followed by John D. Lattin's treatment of collecting and sampling techniques. The third section by W. C. Bentinck, on the structure of insects and the classification of aquatic groups, completes the introductory background chapter for the non-specialist. This information can be used in any region of the world.

The succeeding thirteen chapters treat each of the aquatic groups of insects. These were prepared by well-qualified specialists, as follows: Collembola—D. B. Scott; Ephemeroptera—W. C. Day; Odonata—A. E. Pritchard and R. F. Smith; Orthoptera—I. LaRivers; Plecoptera—S. G. Jewett, Jr.; Hemiptera—R. L. Usinger; Megaloptera, Neuroptera—H. P. Chandler; Trichoptera—D. G. Denning; Lepidoptera—W. H. Lange, Jr.; Hymenoptera—K. S. Hagen; Coleoptera—H. B. Leech and H. P. Chandler; Diptera—W. W. Wirth and A. Stone. A useful glossary compiled by W. C. Bentinck, and an extensive index, complete the book.

An important value of the taxonomic chapters is the complete treatment of all American aquatic genera, north of Mexico, and the citation of the latest monographic works.

An especially attractive feature of the volume is the profusion of well-placed text figures. Many of these have been selected from technical publications rarely accessible to the general worker. A good percentage of the illustrations, however, are original. Those by the British artist, Arthur Smith, in the Hemiptera chapter, represent entomological illustration at its best and set a high standard for others to attain.

This fine encyclopedic volume, published at the modest price of $10.00, is highly recommended to all entomologists and aquatic biologists, regardless of their location.—E. S. Ross, *California Academy of Sciences, San Francisco.*

A NEW STRATIOMYS FROM CALIFORNIA

(Diptera: Stratiomyidae)

MAURICE T. JAMES

State College of Washington, Pullman

The following new species is being described at this time in order to permit its inclusion in a forthcoming contribution to the California Insect Survey series.

Stratiomys tularensis James, new species

Female.—Head black and yellow. Vertex and upper half of front, area around bases of antennae, and middle of face predominantly black; lower half of front and broad sides of face yellow; a yellow spot on the vertex on each side of the ocellar triangle and extending onto the occiput (cerebrale) almost half way to the neck; the yellow of the anterior part of the front, in its median third, strongly bowing, like the profile of a dome, toward the vertex and almost reaching the anterior ocellus; a narrow black streak running from the circumantennal spot to each eye margin and another unpaired streak running upward along the midfrontal suture a short distance, then branching to form a Y; presumably, in some specimens the front may be predominantly black with a circular pre-ocellar spot and a large oval spot on each side above the antennae and broadly bordering the eye. Occipital orbits broad, yellow, with only the suggestion of a blackish spot above. Antennae and proboscis black. Pile of head rather dense, whitish, that of the vertex and upper frons brownish, that of the second antennal segment and of the apex of the first black. Thorax black; postalar callus reddish brown anteriorly; scutellum reddish brown on apical two-fifths, becoming yellow apically, the spines darker-tipped. Femora black; their extreme apices, the tibiae, and the tarsi yellow to golden; the tibiae more or less blackened medially, particularly anteriorly; the tarsi somewhat blackened toward their tips. Pile of thorax rather dense, white, that of the mesonotum largely appressed and without evidence of black areas, that of the pleura tending in places to yellowish, especially on the metapleura, that of the tarsi and the apices of the tibiae, especially ventrally, yellow to golden. Wings hyaline, veins yellow. Abdomen black with lateral yellow markings on the posterior angles of terga 2, 3, and 4, all confined to the outer fourth of the terga; the marking on 2 about three-fifths the length of the segment except laterally, where the black almost separates it from the margin; that on 3 club-shaped, the club head directed medially; that on 4 similar but smaller; tergum 5 with a median apical truncated triangle, the apex of which, if produced, would reach the base of the segment. Venter yellow, marked with black; sterna 1 and 2 predominantly yellow, 1 only darkened laterally, 2 with an elongated triangular marking at each basal corner. Sterna 3 to 5 each about equally black and yellow; they might be described as black with an indefinitely defined trapezoidal yellow area medially at the apex of each sternum. Abdominal pile appressed, whitish to pale yellow. Length, 14 mm.

Male.—Head black except occipital orbits and narrow sides of face. Yellow markings of first abdominal tergum confined to apical half of seg-

ment; those of venter more extensive than in the female as the result of a lateral yellow area developing on each side in the black background of sterna 3 and 4 (these are suggested in the female); the first sternum, however, is more extensively darkened than in the female. Otherwise, except sexually, as in the female.

Holotype female No. 6242, allotype male, 2 MILES SOUTH OF FORESTER PASS, ELEVATION 12,000 FT., TULARE COUNTY, CALIFORNIA, August 11, 1953 (W. M. McDonald); in the collection of the California Academy of Sciences.

This species traces in Steyskal's key (James and Steyskal, 1952) to *barbata*, couplet-7, except that the venter is more extensively yellow and the facial pile of the male is wholly whitish. The more abundant, wholly pale pile of the thorax will also separate this species from *barbata*, which has the metapleural and usually (always, in the male) extensive areas of mesopleural pile black. The yellow areas of the scutellum and of the abdominal terga are more restricted than in *barbata*, whereas those of the sterna are more extensive. The head is broader than in *barbata*; in the female, it is almost as broad as in *badia*, and on the basis of this character one may hesitate about carrying this species beyond couplet 6 of Steyskal's key.

REFERENCE CITED

JAMES, MAURICE T., and GEORGE C. STEYSKAL
1952. A review of the nearctic Stratiomyini (Diptera, Stratiomyidae). Ann. Ent. Soc. Amer. 45(3):385–412.

PACIFIC COAST ENTOMOLOGICAL SOCIETY

W. W. MIDDLEKAUFF
Vice-President

H. B. LEECH
President

D. P. FURMAN
Secretary

PROCEEDINGS

Two Hundred and Forty-sixth Meeting

The two hundred and forty-sixth meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, February 18, 1956, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Hugh B. Leech conducted the meeting. The following members were present: Laura Henry, G. F. Ferris, V. Stombler, H. M. Armitage, Paul Arnaud, W. C. Day, John L. Herring, Donald Linsdale, J. W. Tilden, Don Burdick, Anthony Ross, G. A. Samuelson, G. M. Cagley, Walter Thomsen, L. W. Swan, E. S. Ross, W. W. Middlekauff, P. D. Hurd, Jr., D. G. Denning, J. W. MacSwain, W. A. Doalin, M. S. Wasbauer, J. A. Powell, D. M. Maddox, H. B. Leech, D. P. Furman, and D. D. Jensen. Visitors present as follows: Mrs. Jon Herring, Philip Torchio, Dave Ribber, Paul Opler, R. E. Olson, G. Hage, Frances Crisp.

The minutes of the meeting held December 3, 1955, were read and approved.

Robert F. Schoeppner, Philip Torchio, David Ribble and Dr. Herbert Ruckes, Jr., were elected to full membership in the Society.

Treasurer R. C. Miller gave an informal report of the financial status of the Society.

President Leech announced the resignation of W. W. Middlekauff from the Program Committee. He appointed J. E. Swift to fill the vacancy on this committee. W. C. Day was appointed chairman of a special committee to select the site for the annual Field Trip Meeting, with J. W. Tilden and D. D. Jensen as committee members.

An announcement was made by Dr. Middlekauff drawing attention to the meetings of the Pacific Slope Branch of the Entomological Society of America to be held at the Hotel Claremont, Berkeley, on June 25, 26, 27, and 28, 1956.

In response to the President's call for notes and exhibits, Donald Linsdale exhibited a phengodid beetle and the hollowed out remains of a milliped upon which the beetle was feeding when it was found under a rock in the hills back of Berkeley on February 13, 1956. Female and larval phengodids are found in the soil and under rocks, logs, and boards. The males are usually collected at night around lights to which they are attracted. Donald Linsdale would appreciate receiving information about any other phengodids that have been collected by the members of the society. He would like to obtain as many live specimens as possible. Dead material is probably best preserved by pinning the males and putting the females and larvae in alcohol.

Dr. MacSwain commented that F. X. Williams in 1914 published on Phengodidae, noting their habit of feeding on millipeds; his report is about the only one noting their food habits.

Dr. Ross stated that glow worm spectacles are considered rare on the Pacific Coast, but this concept may be due to the fact that entomologists are not out at the right time to observe them. During a recent cloudburst in Marin County, California, shortly after midnight he observed numerous specimens that were probably larvae and neotenic females of Lampyridae glowing on rocks and logs.

Paul Opler stated he has collected a sphinx moth, *Arconotus lucidus* Boisduval, recently and expressed interest in any other collections from this area. In response Hugh Leech stated a number of males were attracted to light on a rainy evening, June 15, at "The Indians" in the Santa Lucia Mountains, Monterey County. Dr. Tilden agreed males are attracted to lights, but females are harder to collect. He added that the food plant of the larvae is not definitely known.

The President introduced Dr. Lawrence W. Swan of San Francisco State College, who gave a color slide illustrated talk on the 1954 expedition to Makalu Mountain in the Himalayas, with particular reference to his entomological activities. He noted the versatility of the insect collecting net, including twenty-five uses ranging from paddling life rafts to collecting insects. In spite of the barren appearance of the terrain at 20,000 feet elevation he found a variety of life. Where snow was absent collections of debris at bases of rocks supported flattened vegetation including fungi which in turn attracted insects. One small simplified cycle of interlocking forms was represented by Collembola, probably feeding on organic debris or bacteria, anthomyid flies breeding around vegetation at the bases of rocks, and attid spiders preying on both the Collembola and flies. It appears that parasites have followed the flies also since a pupal case was found showing an emergence hole presumed to be that of a parasite. At high altitudes of 18,000 feet occur larger animals such as the pika, a species of partridge and mice.

Following a short discussion, the meeting was adjourned.—DEANE P. FURMAN, *Secretary*.

Two Hundred and Forty-seventh Meeting

The two hundred and forty-seventh meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, March 17, 1956, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Hugh B. Leech, presided at the meeting. The following members were present: G. F. Ferris, Laura M. Henry, J. W. Tilden, W. C. Day, W. W. Jensen, E. S. Ross, P. S. Bartholomew, G. M. Cagley, E. L. Kessel, F. E. Skinner, K. S. Hagen, J. W. Green, D. D. Linsdale, S. W. Hitchcock, W. A. Daolin, H. B. Leech, D. P. Furman, P. H. Arnaud. Visitors present as follows: Mrs. W. C. Day, T. J. Spilman, W. Russell, D. Giuliani, N. A. Walker, Donna Jeran, B. McDaniel, R. E. Olson, G. Pronin.

The minutes of the meeting held February 18, 1956 were read and approved.

G. H. Nelson was elected to full membership in the Society.

E. L. Kessel reported that Saturday, April 21, was the tentative date for the next meeting, with Kenneth Hagen as the speaker, to discuss common lady beetles and their habits.

W. C. Day reported for the Field Trip Committee, setting Russelman Park as the site and suggested a Sunday date in May, preferably May 13. If this should be "Mother's Day" it may be best to hold the trip on Saturday, May 17.

Ted Spilman was introduced as a visitor from the U.S.D.A., Washington, D.C. He is currently working on the Khapra beetle problem in California.

In response to the President's call for notes and exhibits, E. S. Ross exhibited a two-tailed scorpion of such symmetrical development that it was assumed to be of original development and not a regenerative response following injury. Ross also exhibited Baltic amber containing a fossil embiopteran of a new genus from the museum at Hamburg, Germany. It is unusual in that it is the most perfect fossil embiid to become available for taxonomic purposes.

The President introduced Professor G. F. Ferris as the speaker of the meeting. Professor Ferris spoke on the scale insect family Margarodidae. This is perhaps the most peculiar family of the scale insects. It contains the largest members of the superfamily and displays the most peculiar biological phenomena. It includes many forms which begin life as a larva with legs and antennae, then lose these and then gain them back as adult insects. Among such forms are the species of the genus *Margarodes* which live in the soil and surround themselves by a shell of waxy secretion, some of them in this condition being known as "ground pearls." Among these ground pearls is one which has been kept in its immature condition for sixteen years and was found still to be alive. Another peculiar and important genus is *Matsucoccus*, the species of which infest pine trees and cause a certain amount of damage to their hosts. Other peculiar characteristics of members of the family were mentioned.

Following a short discussion, the meeting was adjourned.—DEANE P. FURMAN, *Secretary*.

Two Hundred and Forty-eighth Meeting

The two hundred and forty-eighth meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, April 21, 1956, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Hugh B. Leech presided at the meeting. The following members were present: H. B. Leech, E. S. Ross, M. B. Gershenson, J. G. Edwards, G. F. Ferris, P. A. Arnaud, R. F. Smith, W. A. Daolin, P. D. Hurd, Jr., K. S. Hagen, W. C. Day, W. Russell, J. L. Herring, D. D. Linsdale, J. J. Drea, F. E. Skinner, R C. Miller. Visitors present as follows: P. Westegard, L. Smith, D. Smith, T. Smith, K. Smith, Mrs. W. C. Day, K. Herring, B. J. Adelsen.

The minutes of the meeting held March 17, 1956, were read and approved.

Mr. Robert Shuster and Mr. Wm. Russell were elected to full membership in the Society.

Mr. Day reported for the field trip committee, stating the probable locale was Russelman Park and the probable date was May 20.

President Leech called attention to the coming International Congress of Entomology to be held in Montreal. He suggested that an official delegate

of the Society be named. Mr. Day proposed that Professor Ferris be so designated. It was suggested that the Secretary provide Professor Ferris with a credential letter.

President Leech initiated the notes and exhibits by passing around a can of grasshoppers from Japan, donated by W. C. Day. These were canned for human consumption. The product was labelled in English and distributed by a U.S. dealer in novelty foods, rattlesnake meat, etc.

E. S. Ross exhibited a photograph he had taken of a phengodid larvaform female (or nearly mature larval female) in the act of feeding on a large milliped. The feeding was concentrated in the sternal region just behind the head. The milliped was quite immobile, perhaps as a result of a severance of the ventral nerve cord.

Dr. Gordon Edwards projected two kodachromes of Dr. H. E. Burke, retired U.S. Forest Entomologist, and two kodachromes depicting an anthophorid bee pupa in its cell and a cell occupied by a meloid beetle of the genus *Hornia*.

President Leech then called on Dr. Kenneth Hagen to speak on "Common Lady Beetles and Their Habits."

Biological control of some scale insects and mealybugs has been obtained by introducing into this country various coccinellids of foreign origin. However, none of the aphid-feeding lady beetles that have been imported has become established. Likewise some of our endemic species which have been sent abroad have also failed to become established in the new environments. It is not clear why the aphid-feeding coccinellid introductions have failed. Perhaps part of the difficulty may be linked to a diapause-like condition in the adult stage which many of the temperate coccinellid species exhibit. This condition interrupts reproduction and can last for many months.

Twenty species of common California coccinellids were covered with a brief comment as to their distribution and habits. Kodachromes of these species taken by F. E. Skinner were shown, and obvious characters were pointed out to aid in identifying the species in the field.

A migration of *Hippodamia convergens* from the Sierra Nevada into the Central Valley occurs every spring. This dispersal is apparently largely governed by the speed of easterly winds which carry the beetles over the valley. Remigrations back to the Sierra appear to occur as early as May and involve the progeny of the overwintering beetles. From May to February the beetles are found in the Sierra aggregations, but the aggregational sites change locally with the approach of fall. In these latter sites *H. convergens* overwinters until the dispersal flight the following spring.

Following a lively discussion, the meeting was adjourned.—E. S. Ross, *Secretary pro-tem*.

Two Hundred and Forty-ninth Meeting

The annual field meeting of the Pacific Coast Entomological Society was held at Russelman Park, Contra Costa County, May 20, 1956. The following members were present: E. G. Linsley, D. P. Furman, W. C. Day, W. A. Russell, R. F. Smith, J. W. MacSwain, Jane MacSwain, H. B. Leech, W. W. Middlekauff, G. M. Cagley, Ed Swift, J. H. Freitag, E. O. Essig,

W. S. Ross, A. E. Michelbacher, P. D. Hurd, P. F. Bonhag, D. G. Denning, E. S. Ross, R. Ryckman. Visitors were present as follows: J. A. Linsley, Jim Linsley, Katherine Furman, Phil Furman, Helen Day, E. P. Russell, D. Giuliani, L. Pinzon, Lynne Furman, Libby Smith, Phyllis Middlekauff, Marjorie Swift, K. Sakimoura, Marie Essig, Martha Michelbacher, Grace Hurd, Rose Bonhag, Keizo Yasumatsu, James Denning, Loretta Denning, Mrs. E. S. Ross, Martha Ross, Clark Ross.

A memorable day of pleasure on the sunny slopes of Mount Diablo was the experience of those attending. Collecting nets and baseball bats were used to good advantage, although as the day progressed the swimming pool and shaded picnic tables were increasingly popular. The congenial, informal atmosphere of the gathering was typical of the annual field meetings of the Society.—DEANE P. FURMAN, *Secretary*.

Two Hundred and Fiftieth Meeting

The two hundred and fiftieth meeting of the Pacific Coast Entomological Society was held at 2:15 p.m. on Saturday, October 13, 1956, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Hugh B. Leech presided at the meeting. The following members were present: D. P. Furman, E. O. Essig, A. E. Michelbacher, E. G. Linsley, W. A. Russell, D. J. Burdick, M. Gershenson, D. M. Maddox, G. F. Ferris, W. Thomsen, D. D. Jensen, E. S. Ross, P. D. Hurd, A. E. Pritchard, D. G. Denning, W. C. Day, R. L. Usinger, P. D. Ashlock, M. S. Wasbauer, D. D. Linsdale, J. A. Powell, H. B. Leech. Visitors present were: J. A. Chemsak, Mrs. E. G. Linsley, D. Giuliani, K. Sakimura, Helen L. Day, Virginia Ashlock, W. C. Ferguson, T. S. Acker.

The minutes of the meeting held April 21, 1956, and the field trip of May 20, 1956, were read and approved.

Mr. J. A. Chemsak, and Dr. Y. Tanada of the University of California and Ralph C. Ballard of Pacific Union College, were elected to full membership in the Society.

President Leech appointed Gordon Edwards, E. G. Linsley and W. C. Day to serve as a Nominating Committee in proposing a slate of officer candidates for the society. The Committee is to report at the Annual meeting.

The President called on Professor G. F. Ferris to comment on the 10th International Congress of Entomology held at Montreal in August, 1956. Professor Ferris noted that the meetings were very well attended. He commented on the favorable reception given to a recording of the voice of Dr. Karl Jordan, who was one of the original founders of the Congress. Dr. Ross declared similar recordings of voices of various members of the Society would be most desirable.

Dr. E. G. Linsley exhibited several *Melanophila* beetles. These buprestids are wood borers and there is evidence that they fly a long distance to areas of burning; the beetles are known by fire-fighters. They also occur around certain types of factories such as cement plants where they are known as "stack bugs." *Melanophila* were found at cement plants at Riverside and at Oro Grande on the Mojave desert. They were noted flying

near clinker carts, and at Oro Grande many were collected from the clothing of workers at temperatures of 124 to 135°F.

Dr. R. L. Usinger reported on his summer field trip to Hawaii collecting marine water striders of the family Gerridae. Details of the collections are to be reported elsewhere.

E. S. Ross mentioned his concerted efforts to clear the way for a 1957 field trip to Africa by catching up with his research in the laboratory. However, he made a short trip to Utah and Wyoming where, with the cooperation of Dr. G. E. Bohart and Mr. E. A. Cross, he made a motion picture film of the biology of *Nomia melanderi* and its parasites. This film will be shown at a future meeting of the Society. Still photographs were also made and a selection of these were shown to depict nesting habits of the bee, its bombyliid parasite, and farmer effort to encourage the nesting of the bee in the vicinity of alfalfa fields.

Dr. Ross also showed a miscellaneous selection of insect kodachromes, noteworthy of which were close-ups of a fine fossil apterous male embiid in Baltic amber for which a new generic name will be proposed.

President H. B. Leech commented on his trip to Junipero Serra Peak in the Santa Lucia Mountains, Monterey County, California, August 8–16. His account is summarized below.

The mountain range is 25 to 30 miles wide and extends about 100 miles south from Monterey. About five peaks extend above 5000 feet elevation with at least a dozen over 4000 feet high. Mount Junipero Serra (formerly known as Santa Lucia Peak) is the highest at 5844 feet. The mountains are steep and densely covered with chaparral of various compositions.

Junipero Serra Peak can be reached by a four-hour 4000 foot climb starting at the south slope from "The Indians." The Forest Service maintains a controlled "Jeepway" to service the fire lookout tower on the peak. The east, south, and west slopes are covered with chaparral, chiefly manzanitas (*Arctostaphylos* spp.), with scattered patches of maul oak (*Quercus chrysolepis* Liebm.), deerbrush (*Ceanothus integerrimus* H. and A.), and occasional yuccas. At the summit this cover is being encroached on by young coulter and sugar pines from the mature stand on the north slope. Indicators of the nearest water are big incense cedars (*Libocedrus decurrens* Torr.), large oaks, alders and maples, in canyons on the north and east slopes.

The annual precipitation comes as winter rain and snow. The best time to collect on Junipero Serra is late June through mid-July, when flowers are in bloom. In mid-August everything was exceedingly dry; fewer than two dozen moths came to light in a week! Following are a few of the more interesting records of insects taken.

Paregle cinerella (Fallen)—An anthomyiine fly, det. M. T. James. Present in buzzing swarms in the pine woods at the peak; attracted to any moisture, but remarkably so to dishwater containing a liquid detergent cleaner; into this they dived by hundreds. This species breeds in dung, and may have come from the heavily fertilized fields of the Salinas Valley.

Trioza bakeri Crawford—A psyllid, det. D. D. Jensen. Large numbers beaten from the foliage of young sugar pines (*Pinus lambertiana* Dougl.),

very few from the intermixed Coulter pines. Normal host is cascara, *Rhamnus crocea* Nutt., growing nearby.

Altica torquata LeConte—A metallic flea beetle, det. L. G. Gentner. Unlike the psyllid, this species was beaten in numbers from the foliage of young Coulter pines (*P. coulteri* Don.), but was virtually absent from the sugar pines. It is a pest of grapes and other plants; Mr. Gentner suggests the beetles were merely seeking shelter on the pines, and chose the Coulter because of their much denser foliage.

Philonthus varians auctt., nec. Gyll., and *Aleochara bipustulata* Linn.—Staphylinid beetles, det. I. Moore. Members of the party occasionally complained of being bitten by black flies. I, too, was bitten, but in each case the culprit proved to be one or the other of the above beetles, which flew in numbers during the heat of the day and lit readily on camp effects and on people.

Nyctoporus vandykei Blaisdell—A zopherid beetle, formerly placed in the Tenebrionidae; det. H. B. Leech. Previously known only from the Sierra. This species, with various tenebrionids, was taken only in molasses bait traps in the forest floor.

Tragosoma pilosicorne Casey—A prionine cerambycid beetle, det. E. G. Linsley. Taken at light. A rare species, not previously reported from Monterey County.

Following a brief discussion the meeting was adjourned.—DEANE P. FURMAN, *Secretary*.

Two Hundred and Fifty-first Meeting

The two hundred and fifty-first meeting of the Pacific Coast Entomological Society was held at 2:00 p.m. on Saturday, December 15, 1956, in the Morrison Auditorium of the California Academy of Sciences, San Francisco. President Hugh B. Leech conducted the meeting. The following members were present: R. C. Miller, G. F. Ferris, Laura M. Henry, L. R. Gillogly, R. L. Doutt, F. E. Skinner, E. O. Essig, A. E. Michelbacher, E. S. Ross, E. G. Linsley, J. W. MacSwain, W. W. Middlekauff, D. D. Jensen, R. P. Allen, K. F. Innes, S. W. Hitchcock, D. D. Linsdale, J. A. Chemsak, W. C. Day, O. W. Graf, Jr., H. B. Leech, D. P. Furman, J. G. Edwards. Visitors present were: Alan Gillogly, Mrs. L. R. Gillogly, James Gillogly, L. A. Stange, A. Menke, T. S. Acker.

The minutes of the meeting held October 13, 1956 were read and approved.

D. L. Dahlsten, H. R. Moffitt, R. W. Bushing and Mary Kimball were elected to membership in the Society.

President Leech noted that Professor E. O. Essig had resigned the chairmanship of the Publication Committee. A new chairman is to be selected by the Committee.

Dr. Miller reported on the financial standing of the Society as of September 30, 1956. The report was accepted and placed on file.

In response to the President's call for notes and exhibits E. S. Ross exhibited a collection of katydids from Tingo Maria, Peru. The species, in

their diverse color and form, demonstrated all the principles of animal concealment and mimicry. A large percentage of the specimens represented new species and genera. A phasmid and a katydid demonstrated convergence in camouflage, the hind wing of each showing similar maculation despite the fact these surfaces are normally concealed.

F. E. Skinner demonstrated living ichneumonid parasites from pupae of *Fannia canicularis* (Linnaeus), the lesser house fly, collected from poultry farms near Hayward, California.

J. Gordon Edwards exhibited a male *Graphisurus obliquus* LeConte and a female *G. spectabilis* (LeConte) which were reared from bark of a digger pine log collected last spring. The pine was killed last winter near San Antonio Valley east of Mt. Hamilton. This represents the first record of *Graphisurus* from digger pine.

L. R. Gillogly exhibited "Colored illustrations of the insects of Japan—Coleoptera" a revised edition by T. Nakane published in 1955, edited by the Kinki Coleopterological Society, Osaka, Haikusha, Japan.

H. B. Leech exhibited a book titled "Taxonomists' glossary of genitalia of insects" edited by S. L. Tuxen and published in 1956 by E. Munksgaard, Copenhagen at the list price of $12.80. It represents contributions from several authors.

Mr. J. G. Edwards reported that the nominating committee proposed the following as officers of the Society during 1957: W. W. Middlekauff, president; D. D. Jensen, vice-president; D. P. Furman, secretary; R. C. Miller, treasurer. They were unanimously elected.

The chairmanship of the meeting was then turned over to Dr. Middlekauff who called on Mr. Leech to give his retiring presidential address entitled, "Notes on the Life History and Future Habits of The Pacific Coast Entomological Society."

Mr. Leech's address was followed by a lively discussion centering around the subjects of aims of the Society and its future growth.

Following the discussion the meeting was adjourned.—DEANE P. FURMAN, *Secretary.*